

UNITED STATES OF AMERICA  
DEPARTMENT OF ENERGY  
OFFICE OF ELECTRICITY DELIVERY AND ENERGY  
RELIABILITY

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ELECTRICITY ADVISORY COMMITTEE  
+ + + + +  
MEETING

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THURSDAY  
OCTOBER 20, 2011  
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The Electricity Advisory Committee met, in the Conference Center of the National Rural Electric Cooperative Association Headquarters, 4301 Wilson Boulevard, Arlington, Virginia, at 8:00 a.m., Richard Cowart, Chair, presiding.

MEMBERS PRESENT

RICHARD COWART, Regulatory Assistance Project,  
Chair

RICK BOWEN, Alcoa

RALPH CAVANAGH, Natural Resources Defense  
Council

THE HONORABLE ROBERT CURRY, New York State

Public Service Commission

JOSE DELGADO, American Transmission Company  
(Ret.)

ROGER DUNCAN, Austin Energy (Ret.)

ROBERT GRAMLICH, American Wind Energy  
Association

MICHAEL HEYECK, American Electric Power

JOSEPH KELLIHER, NextEra Energy, Inc.

EDWARD KRAPELS, Anbaric Holdings

RALPH MASIELLO, KEMA

RICH MEYER, National Rural Electric  
Cooperative Association, for Barry  
Lawson

DAVID NEVIUS, North American Electric  
Reliability Corporation

IRWIN POPOWSKY, Pennsylvania Consumer Advocate

WANDA REDER, S&C Electric Company

BRAD ROBERTS, Electricity Storage Association

THE HONORABLE TOM SLOAN, Kansas House of  
Representatives

GORDON van WELIE, Independent System Operator  
of New England

MIKE WEEDALL, Bonneville Energy Administration

BRIAN WYNNE, Electric Drive Transportation  
Association

PRESENT FROM THE DEPARTMENT OF ENERGY

PATRICIA HOFFMAN, Assistant Secretary for  
Electricity Delivery and Energy  
Reliability

DAVID ANDERSON, Energy Efficiency and  
Renewable Energy, Vehicle Technologies  
Program

CAITLIN CALLAGHAN, ORISE Fellow, Office of  
Electricity Delivery and Energy  
Reliability

MICHELLE DALLAFIOR, Office of Fossil Energy

HANK KENCHINGTON, Deputy Assistant Secretary  
for R&D, Office of Electricity Delivery  
and Energy Reliability

LARRY MANSUETI, Office of Electricity Delivery  
and Energy Reliability

DAVID MEYER, Office of Electricity Delivery  
and Energy Reliability

MATT ROSENBAUM, Office of Electricity Delivery  
and Energy Reliability

MERRILL SMITH, Program Manager, Office of  
Electricity Delivery and Energy  
Reliability

ENERGETICS STAFF PRESENT

TANYA BURNS

CAMI DODGE

NATALIE KEMPKEY

KATIE SHAY

PEGGY WELSH

ALSO PRESENT

TOM BIALEK, Chief Engineer, Smart Grid,  
San Diego Gas & Electric Company

JOHN HOWES, Redland Energy

WARREN LASHER, Electric Reliability Council of  
Texas

ROBERT LASSETER, Emeritus Professor, College  
of Engineering, University of Wisconsin-  
Madison

BRAD NICKELL, Western Electricity Coordinating  
Council (via telephone)

ELLIOT ROSEMAN, ICF International

JOHN SHENOT, Regulatory Assistance Project

ANDREW SHINE, Battelle

FRITZ WALKER, Air Products

DAVID WHITELEY, Eastern Interconnection  
Planning Collaborative

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P-R-O-C-E-E-D-I-N-G-S

8:10 a.m.

CHAIR COWART: All right, good morning.

If you take a look at the agenda, you will see that we have quite a number of action items as well as some thoughtful panels on for today. And so, I think we should get going.

I want to thank everybody for being here. And for those of us, a bunch of us, who had dinner together last night, thanks for the opportunity to meet together outside of this room. That was enjoyable.

Our first agenda topic this morning is a panel discussion on microgrids. I think Ralph Masiello is going to tee this up.

MEMBER MASIELLO: The motivation for the panel this morning is so the Committee can consider whether some aspect of microgrids are a topic for the work plan in the coming

1 year, at least my motivation for organizing  
2 it.

3 So, we have three panelists:

4 Merrill Smith from the Department  
5 of Energy, who will tell us what the  
6 Department programs, projects, and plans are  
7 around microgrids;

8 Bob Lasseter from Wisconsin, who  
9 has been very active in the field for more  
10 than a decade, right, and very involved with  
11 CERTS, and I am going to use the word  
12 "autonomous" local control. And he will  
13 describe some of those projects.

14 And Tom Bialeck from San Diego Gas  
15 and Electric, who is involved with microgrids  
16 in San Diego's systems, where there are some  
17 of the larger and more ambitious projects  
18 underway.

19 So, with that, I think let's let  
20 the panel do their presentations and see where  
21 the discussion takes us.

22 MS. SMITH: So, can you hear me

1 all right?

2 So, as Ralph said, I am going to  
3 talk a little bit about the work that we are  
4 currently undertaking in the microgrids base  
5 and what is going on and what we hope to do as  
6 we move forward in the future in the microgrid  
7 area. We have started a planning process for  
8 that, and I will talk a little bit about that.

9 So, just to start off, to put it  
10 in perspective, the microgrid work is done  
11 under the Smart Grid Program. It is just a  
12 subarea of Smart Grids. These are the Smart  
13 Grid R&D Program goals, the long-term 2020  
14 goals for self-healing distribution grid for  
15 improved reliability and integration of  
16 DER/FDR, electric vehicles for improved system  
17 efficiency.

18 If you look down at the lower  
19 boxes, 20 percent saving reduction in  
20 distribution outages, greater than 90 percent  
21 reduction in outage time of required loads,  
22 and 20 percent load factor improvement, are

1 all areas that we think microgrids can impact.

2 So, the Smart Grid Research and  
3 Development, the program area, as I mentioned,  
4 microgrids falls under one of the R&D areas  
5 within the Smart Grid Program. Right now, our  
6 planning number going forward for this fiscal  
7 year is \$20 million. And that is not just for  
8 microgrids. That is for all of the Smart Grid  
9 work.

10 So, let's start with a definition  
11 of microgrids. I know you all had a paper  
12 that you got prior to this. I took a read of  
13 that, and there was a definition of microgrids  
14 in there. It is very, very close to this  
15 definition.

16 And by way of transparency, I will  
17 tell you where this definition came from and  
18 how it came to be. We have a group. It is  
19 called the Microgrid Exchange Group. It is  
20 not a group like this. It is a very informal  
21 group. It is made up of individuals that are  
22 actually working in microgrid deployment or

1 research.

2           And I had a crazy idea of trying  
3 to come up with a definition for microgrids by  
4 committee. So, you can imagine it didn't go  
5 quite as quickly as I would have liked. Of  
6 course, not every single person would  
7 necessarily agree with this definition. They  
8 may take exceptions to certain aspects of it.  
9 But, for the most part, we got a group of  
10 about 30 or so people to agree to this  
11 definition and give input and come up with  
12 this.

13           So, I am just going to read it for  
14 those who are not close to the slide. It is  
15 a microgrid is a group of interconnective  
16 loads and distributed energy resources within  
17 clearly-defined electrical boundaries that act  
18 as a single controllable entity with respect  
19 to the grid. A microgrid can connect and  
20 disconnect from the grid to enable it to  
21 operate in both grid-connected or island-mode.

22           I don't know what the format of

1 this panel is. I don't know if you want to  
2 ask questions now, or should we wait until the  
3 end? Okay.

4 And I will just give a little  
5 story, too. Unfortunately, I know we wanted  
6 some DoD folks, somebody from DoD to sort of  
7 give an overview of what DoD is doing in this  
8 area. When we get to the discussion portion  
9 of this, I can talk a little bit about the  
10 things that I know about.

11 But yesterday I was at a military  
12 Smart Grid and Microgrid Conference, and the  
13 Army talked and the Navy talked, the Air Force  
14 talked. This was the first time I have been  
15 to something like this where folks -- I know  
16 the Army, and I can't remember whether the  
17 morning was the Navy or the Air Force, both  
18 gave definitions of microgrids, and they were  
19 also very, very close to this, which I was  
20 very encouraged by.

21 It is sort of convening and coming  
22 down to one more universal definition. So,

1 maybe I'm turning into the microgrid geek, but  
2 that was very exciting, you know, to hear them  
3 talk about their definitions.

4           Just a quick slide to show how  
5 microgrids clearly fit into the role of grid  
6 modernization and support the attributes of  
7 energy efficiency, system efficiency,  
8 reliability, and security with some of the  
9 things that they allow to happen on the  
10 distribution grid.

11           So, sort of an overview of what we  
12 are working on: what we currently have has  
13 2011 and prior, and those are also projects  
14 that are ongoing because some of them are  
15 long-term, maybe five-year demonstration  
16 projects, some work at the labs.

17           So, we have demonstration projects  
18 for the integration of renewals and other  
19 distributed energy resources. We have some  
20 small modeling effort for distributed energy  
21 resource integration. We have the CERTs  
22 testbed, which Bob will talk about. That

1 first thing I talked about is one of the  
2 projects that Tom will talk about today. And  
3 also, there is the CERTS technology being used  
4 in one of those projects.

5 We are actually working with DOE  
6 through some Energy Surety Microgrid  
7 activities and, also, through a project called  
8 SPIDERS, which, if you haven't heard about it,  
9 I will have a slide or two on that. And also,  
10 some standards development that we have been  
11 supporting all along and are working on.

12 So, the renewable and distributed  
13 systems integration projects, there were nine  
14 demonstration projects awarded in this area.  
15 The key goals -- and when we started this  
16 work, this was really prior to us talking  
17 about having a microgrid effort. But, in  
18 fact, one of the requirements of these  
19 projects was to demonstrate their ability to  
20 operate in island-mode and then reconnect to  
21 the grid, and, also, to have multiple  
22 generation sources.

1           So, they really do fit the  
2 definition of microgrid. Their primary goal  
3 was to show their ability to reduce peak load  
4 that the system saw by 15 percent.

5           And this is just a quick listing  
6 of those projects. So, you will be able to  
7 see that a little more when you get a copy of  
8 this presentation. The first two projects on  
9 the list are the projects that you will hear  
10 more about from Bob and from Tom.

11           We have the CERTS microgrid  
12 testbed, and that was set up several years ago  
13 to demonstrate the viability of the microgrid  
14 concept and the CERTS microgrid control. We  
15 are now expanding that effort to add  
16 intermittent sources, intermittent generation  
17 sources, some storage, and some load-shedding.

18           And I think, Bob, you are going to  
19 talk more about that as well.

20           So, we also have a small modeling  
21 effort. Basically, the DER-CAM model is a  
22 tool for optimizing the use of distributed

1 energy resources in the microgrid, you know,  
2 when you would turn things on or off and what  
3 the optimal way to operate is.

4 The Energy Surety Microgrid work,  
5 this is the work that we have been doing in  
6 conjunction with DoD. We are working in  
7 partnership with Sandia National Laboratory.  
8 When the project started, we thought we would  
9 look at some military facilities, with  
10 military facilities being one of those  
11 facilities that we felt would be prime  
12 candidates for microgrids.

13 There were some facilities that  
14 were interested in microgrids at the time. We  
15 started to talk to those individual  
16 facilities, and we cost-shared with those  
17 facilities some microgrid viability and  
18 conceptual designs for them.

19 And I don't know if everybody  
20 would agree with me or not, but I like to  
21 think that actually this work that we did in  
22 the Energy Surety Microgrid area was really

1 the launching pad for the SPIDERS project that  
2 is now an official project and funded by both  
3 DOE and DoD and DHS. And the reason I say  
4 that is two of the three SPIDERS facilities  
5 that will be demonstrated first received  
6 conceptual designs through this effort.

7 So, the SPIDERS project, it is an  
8 acronym that, for some reason, I just cannot  
9 memorize. It is the Smart Power  
10 Infrastructure Demonstration for Energy  
11 Reliability and Security. It rolls right off  
12 the tongue, right?

13 So, the SPIDERS project,  
14 ultimately, at the end of three years, at the  
15 end of completion, will be three microgrids of  
16 varying complexities. And one of the primary  
17 goals of SPIDERS, besides just deploying a  
18 microgrid, is to do a rigorous cybersecurity  
19 overlay that would be approved by DoD. The  
20 three bases are Pearl Harbor Hickam, Fort  
21 Carson, and Camp Smith.

22 So, the way it is often described

1 is a crawl, walk, run sort of configuration  
2 with Pearl Harbor Hickam being the first  
3 facility. By the end of next year, that  
4 should be complete and operating. It is just  
5 a small portion of that facility. It is  
6 focused on their waste water treatment  
7 facility and utilizing some of the renewables  
8 that they already have on base.

9 Fort Carson has several of the  
10 feeders that will be able to be islanded with  
11 -- I forget how many buildings -- it is at  
12 least nine buildings. And there is also a  
13 focus on that one with electric vehicles.  
14 They have already started to procure some of  
15 those vehicles. Some of them are large work  
16 vehicles, like work trucks, so larger than  
17 just cars.

18 And then, Camp Smith, the full  
19 base will be the microgrid, and that will be  
20 the third and final piece of that.

21 The standards work that I  
22 mentioned, we have been supporting the

1 development of IEEE P1547, and more relative  
2 to microgrids, we have also been supporting  
3 IEEE P1547.4, which we sort of call the  
4 microgrid standard because it is really  
5 focused on islanded systems and connecting and  
6 disconnecting, islanding and reconnecting to  
7 the grid.

8           So, moving forward, that is all of  
9 the things that we have going on currently.

10 Most of the work that we currently have has  
11 been focusing on conceptual designs, testbeds,  
12 and some demonstrations, a little bit of  
13 analysis. And having worked for a couple of  
14 years with those activities, we realized that  
15 there are some additional key R&D activities  
16 that are needed to overcome technical and cost  
17 barriers for broader acceptance of microgrids  
18 and their deployment.

19           So, if funding allows moving  
20 forward, we would like to focus our next R&D  
21 effort on some of these microgrid areas. So,  
22 right now, we held a workshop at the end of

1 August, and we are working on refining the  
2 information that came out of that. That  
3 report should be out by likely the end of this  
4 month.

5 We came up with some long-term  
6 targets. If you see the targets there, the  
7 improve system efficiencies by greater than 20  
8 percent, reducing emissions by 20 percent, and  
9 reducing outage time to require loads by  
10 greater than 98 percent, you will see that  
11 that aligns with that very first slide that I  
12 put up there.

13 We want to develop commercial-  
14 scale microgrids at a cost comparable to non-  
15 integrative baseline solutions. That is not  
16 an easy goal, but that is what we need to  
17 shoot for to make these systems something that  
18 people can consider and make them viable.

19 We had a planning group that came  
20 together. These were primarily laboratory  
21 folks that had been working in the microgrid  
22 area and said, based on your experience, what

1 are the major cost components of a microgrid?  
2 Where are the trouble spots? Where can we  
3 really start to look and focus an R&D program?

4 This is what we came up with:  
5 energy resources, 30 to 40 percent. Of  
6 course, that is one that can vary a lot,  
7 depending on what those energy resources are.  
8 It is going to be a big difference if you are  
9 putting in a bunch of diesel gensets as  
10 opposed to renewables.

11 Switchgear protection and  
12 transformers, Smart Grid communications and  
13 controls, and site engineering and  
14 construction, because although components of  
15 the microgrid, I think can be pre-engineered  
16 and developed. The microgrid itself is going  
17 to have to be designed for the individual  
18 site. So, that is not a cost that can go way,  
19 way, way down.

20 And so, we held our workshop. We  
21 had about 75 people in attendance. We were  
22 turning people away because we just didn't

1 have the facilities to accommodate everybody  
2 that wanted to come, and it wasn't a come-and-  
3 listen meeting. It was a come-and-work  
4 meeting. And so, it was encouraging that that  
5 many people really wanted to come and give  
6 input to this.

7 This is our first cut at the  
8 results of that meeting on identifying some  
9 high-priority areas. And what we will do is  
10 use this information here, if funding is  
11 available, to help us develop a solicitation  
12 to target specific research areas in  
13 microgrids.

14 And then, last -- this doesn't do  
15 you any good until you get the presentation --  
16 just some resources, some online resources for  
17 microgrids that you might find useful.

18 And that's all I had.

19 MEMBER MASIELLO: Good.

20 Richard, we should go through all  
21 three and then do Q&A?

22 CHAIR COWART: I think so.

1 MEMBER MASIELLO: Good. Okay.

2 MS. SMITH: I'm sorry?

3 MEMBER MASIELLO: We will go  
4 through all three presentations --

5 MS. SMITH: Okay.

6 MEMBER MASIELLO: -- and then have  
7 discussion.

8 MS. SMITH: Okay.

9 MEMBER MASIELLO: Things will work  
10 better.

11 Dr. Lasseter?

12 MR. LASSETER: I found your  
13 discussion yesterday very interesting.  
14 Because some of the thinking we have been  
15 doing in microgrids for the last 10 years kind  
16 of relates to this. What started microgrids  
17 was complexity, the fact that there is so much  
18 new technology, what we call distributed  
19 energy resources, everything from small  
20 internal combustion engines, microturbines, et  
21 cetera, that it became obvious a good while  
22 ago that we had to deal with complexity.

1                   But now if you take this  
2 complexity that is coming about with small DER  
3 units and look at the big picture of the power  
4 system, it has complexity, too.

5                   And the one point that I think is  
6 critical that has been in our thinking is that  
7 we have started looking at reliability. And  
8 years ago, EPRI came out with what they call  
9 a reliability chart over time and the famous  
10 nine 9s of reliability they needed for  
11 contemporary digital systems, which is sort of  
12 nonsense because that is like one cycle outage  
13 per year.

14                  And so, if you think about this,  
15 you say, hey, reliability makes sense at the  
16 customer level as a concept. Maybe I should  
17 call it power quality. But at the high-  
18 voltage transmission system, it doesn't make  
19 sense. And so, perhaps we have to rethink it.

20                  In the transmission world, do we  
21 really mean reliability or do we mean  
22 availability? If we have enough sources at

1 the user, at the loads, then outages aren't as  
2 critical as long as they don't cascade out.  
3 So, I would say we may want to think about the  
4 transmission system from availability in  
5 limiting cascading faults and move our custom  
6 design levels of reliability down to the  
7 customer level for whatever their needs happen  
8 to be. Now that is a real paradigm shift to  
9 what the utilities have been doing, but I  
10 think that is defensible, if you really want  
11 to look at it.

12 Now a lot of this has been said.  
13 These are a variety of DER technologies. And  
14 dealing with large numbers is really what the  
15 microgrid is all about. I mean, if you think  
16 about it, and this started with California  
17 about 10 years ago saying, "We want 20 percent  
18 penetration." Well, that's hundreds of  
19 thousands of these things.

20 And you think about this thing of,  
21 do we control each one as an individual  
22 component right now? You get into a level of

1 complexity and misoperation that doesn't make  
2 any sense.

3 And so, what a microgrid really  
4 says is we physically group these devices with  
5 the loads and make them a single controllable  
6 unit. On Merrill's slide, she has a thing,  
7 you know, do no harm to the utility or a good  
8 neighbor type of thing. But you don't have to  
9 know all the details of the microgrid; you  
10 just have to know what it can provide to you,  
11 what services it is.

12 For example, you could put a lot  
13 of PV in a microgrid with some storage or some  
14 fast-responding generation and provide  
15 predictable, renewable energy to the grid, at  
16 least as far as cloud cover is concerned.  
17 Storms you can't do with that. So, you could  
18 make it ease up the utilities problem with PV  
19 when you group them with other resources and  
20 have a whole range of operation.

21 This is just a simple schematic.  
22 But the two things that I think really move

1 microgrids is, one, it deals with the high  
2 level of penetrations or dealing with a high  
3 number of these new sources. But another  
4 thing that is involved is that that can really  
5 improve efficiency and reliability.

6 One very important thing is waste  
7 heat. If you have small units, and it is in  
8 this building, it can provide heating and  
9 cooling much easier than in a campus model  
10 with a lot of underground piping to make that  
11 happen. It obviously can reduce the  
12 transmission losses coming in.

13 And so, there's a lot of pluses in  
14 efficiency, and you can build N+1 type of  
15 things into it, so you don't have to rely on  
16 the utility, if that is what you want to do.  
17 So that, when any resource fails, you can  
18 still function.

19 You can almost think of DER as  
20 being more a commodity, more like a  
21 refrigerator or appliance that I plug in  
22 rather than a complex engineering system. And

1 I think we can move in that direction.

2 Now these are just the drivers,  
3 and the most important one is a way of dealing  
4 with high penetration of DER. And I think,  
5 right now, what we have done with the CERTS  
6 microgrid, within the microgrid itself we can  
7 show UPS power quality. And that is because  
8 we can island within a cycle, so there is an  
9 event on the utility. We island, and then all  
10 our sources are voltage sources. And so, you  
11 have a stiff voltage source in the system.  
12 And so, the tests we have been able to do, we  
13 just see no fluctuation of voltage on an event  
14 at the AEP testsite.

15 The emissions and the  
16 efficiencies, CHP transmission losses, demand-  
17 side management, and support of renewables, I  
18 think we know how to do that.

19 And on the reliability and  
20 modularity, the key point is that we want plug  
21 and play, so that I can scale this system  
22 without having to do a lot of extensive

1 engineering.

2           The systems that are at AEP and  
3 some that are in the field are all using  
4 exactly the same concepts. And so, the  
5 engineering is worrying about how the  
6 protection is going to be, just traditional  
7 type of site engineering, and no special  
8 engineering relative to the microgrid itself.

9           Now there's really two models out  
10 there. I talk about the CERTS microgrid or  
11 the autonomous model, but most major  
12 manufacturers currently build one that depends  
13 on command-and-control systems. Now the  
14 difference in the philosophy is, in the case  
15 where you have a control system in here, you  
16 are saying: I take existing generation, I  
17 take whatever I am using, I use it as it comes  
18 from the manufacturer and put a layer of  
19 control and communications on top of that to  
20 let it island. Our approach has been, hey, we  
21 modify the component itself by changing its  
22 control algorithms, so that it is plug and

1 play in a microgrid world.

2 And so, just the components on the  
3 definition, you see this red box here. This  
4 has to be a switch that can open at some speed  
5 to island it. When it islands, you have to  
6 make up the load difference. If it was  
7 importing a certain amount of power, now the  
8 local generation picks it up.

9 And so, you have, over here on the  
10 lefthand side, you have control systems,  
11 things that are deciding how to allocate the  
12 generation, what the load is, and these  
13 different kind of criteria. And then, you  
14 have all this heat distribution system. The  
15 biggest problem is, if the control system  
16 fails, you may not be able to function as an  
17 island. And if you want to expand this, you  
18 have to redesign a lot of your design  
19 algorithms and communication systems.

20 Now let's take the same thing and  
21 deal with an autonomous microgrid. Now the  
22 first thing is that this little circle on the

1 lower left is we are saying, hey, this is a  
2 microgrid; it can work without communications,  
3 but it does have communications on the  
4 multiple second timescale. But things down in  
5 the hundreds of milliseconds or cycles has to  
6 be done autonomously. And you could have  
7 whatever mix of PV, critical loads, non-  
8 critical storage, CHP machines.

9 But now they are in the building.  
10 It actually increases the reliability because  
11 now I am not susceptible to faults in the  
12 higher voltage line. I don't have fast  
13 communications. I can island autonomously and  
14 resynch myself. And so, we end up with a lot  
15 more flexibility and a lot less engineering  
16 once we prove out these concepts.

17 Now I could spend an hour on these  
18 kinds of things. But if you think about how  
19 we technically do the microgrid, it is no  
20 different than how we do 100-megawatt-plus  
21 generation in a high-voltage system. It is  
22 autonomous. There is a droop in there. In

1 other words, in the power system, if a load  
2 comes on near a machine, it slows down its  
3 frequency, takes the energy out of the  
4 inertia. That gives feedback to the energy  
5 source to bring that back up. And ISO is not  
6 worrying about what is happening in that  
7 second time range. And so, microgrid is  
8 exactly the same as that.

9           The important thing that is  
10 different in a microgrid is allocating  
11 overloads. And what that is saying is that,  
12 if I have two sources in a microgrid and one  
13 is operating near its peak output, and the  
14 other one is operating lower, and I am  
15 importing power and I island, both of them  
16 pick up approximately one-half of the load.  
17 So, we have one overloaded.

18           And a key thing in making this  
19 surge thing work is that machine has logic in  
20 its control that will drive down its load and  
21 transfer it over to the other machine without  
22 having to have communications. It is

1 communicating through frequency variations and  
2 across the power grid itself. That is what  
3 really makes this work. So, I can add more to  
4 the system, but they all protect themselves by  
5 reallocating the load balance when there is a  
6 transient change in it. And then, the  
7 interface, which is also important, that you  
8 can seamlessly get off and get back on  
9 transient-free.

10 Now you saw some of this. This is  
11 the testsite at AEP Walnut facility. It has  
12 been funded, basically, some level between the  
13 California Energy Commission and the  
14 Department over the last 10 years, and we are  
15 now doing new work on that.

16 And notice up here I say it is  
17 inverter-based, there's no communications, and  
18 there is no storage. And we have three  
19 machines in this lower righthand corner and  
20 they are all identical to each other. They  
21 all have the same internal controls, and then  
22 we can see how they behave.

1                   And these checkmarks are things  
2                   that we have been able to show. For example,  
3                   down here at the bottom, the UPS, at fairly  
4                   high cost of fuel, we ran for 60 days there  
5                   and collected UPS data, and found out that the  
6                   load saw effectively no fluctuations in  
7                   voltage. So, you could say, hey, not only do  
8                   we have a system that could do waste heat and  
9                   improve the efficiencies, but we have a system  
10                  that can provide an alternative to commercial  
11                  UPS systems.

12                  Now out of this, there was a small  
13                  company talked Tecogen. And they have come up  
14                  with the first commercial CERTS-compliant type  
15                  of machine. At this point, I think they have  
16                  sold about 50 or 60 of them.

17                  And it is a fairly sophisticated  
18                  machine. It runs variable speed, so that it  
19                  can have high efficiency at partial loads.  
20                  And at least they claim that the power  
21                  electronics we have to put on that and those  
22                  losses are made up by the variable-speed

1 nature of its prime mover. And the real  
2 selling point is this overall efficiency  
3 pushing 80 percent because they can use the  
4 waste heat, and they can also use the power  
5 coming out of it.

6 Now one interesting story that the  
7 CEO was telling me is they don't really have,  
8 quote, "full CERTS microgrids" out there, but  
9 there is a dock in Manhattan that is a  
10 beverage company that is on it. With all this  
11 refrigeration, it turns out the utility feeder  
12 can't meet the load. So, what they have done  
13 is I think there's five or six of these  
14 machines sitting there running in the CERTS  
15 microgrid mode 24/7, and the customer is very  
16 satisfied by that.

17 And, see, this is what is  
18 happening: if you want to call it disruptive,  
19 is customers can look at this and say, hey, I  
20 can use the waste heat, improve the  
21 efficiency, improve my power quality, and pay  
22 this out over three years. These things are

1 being built in places like on this dock or in  
2 nursing homes and school systems. And this is  
3 sort of percolating up from the bottom, but  
4 being driven by this is the cost-effective way  
5 to deal with it.

6 Now I am involved with, outside of  
7 the AEP, with five other projects. Let me  
8 just try to give a fairly quick overview.

9 This is at Sacramento Mutual  
10 Utility District's headquarters. This is the  
11 first full-scale CERTS microgrid. If you look  
12 in this diagram, the blue stuff are either  
13 chillers or hot water for CHP type of work.  
14 Over to the left is a field reporting  
15 facility, which is also the backup control  
16 center for SMUD.

17 And so, what we are going to be  
18 able to do here is collect data. Is CHP in  
19 the real world really as efficient as we are  
20 claiming at 80 percent? And is the power  
21 quality that we are claiming really UPS-like?

22 This is being put together right

1 now. I was on a phone call a couple of days  
2 ago, and what are we going to measure to get  
3 this data that is in a believable form right  
4 now?

5           There is Phase 2 of that, which I  
6 believe is being funded by the Department  
7 through Premium Power, which is a flow battery  
8 company, which we are going to put, also,  
9 storage on this system. Now, hopefully,  
10 there's going to be four to six months between  
11 the two, so we can make sure that the, quote,  
12 "pure" CERTS microgrid functions well in the  
13 field and meets our expectations. And then,  
14 we will see how storage can supplement that.

15           The one thing SMUD is really  
16 interested in is looking at issues of export,  
17 how we deal with the protection, how do we  
18 operate, and real interesting questions. But  
19 those are still sort of being formulated as we  
20 get some actual data and performance.

21           This is the big project which is  
22 really, really interesting. This is out at a

1 jail called the Santa Rita Jail, just south of  
2 California. Already existing there is a  
3 megawatt fuel cell, which you see in the top.  
4 And then, in the bottom you see the jail  
5 itself. These are all PV units, which is  
6 somewhere around a megawatt worth of PUV.  
7 There's 2, roughly, megawatt diesel generators  
8 for backup, and we are putting a large  
9 storage, 4-megawatt hour of lithium ion  
10 battery, which was the inverters were built by  
11 S&C, that we tested them in the factor a month  
12 ago, and they are now being tested in the  
13 field.

14           And I think in the end of this  
15 month we will be actually doing a full  
16 islanding test, bringing the generators into  
17 it, see how effective the storage works. And  
18 this is off of a 12-kV system.

19           Now one of the interesting things,  
20 as Merrill had talked about, this was a peak-  
21 shaving type of thing. But one of the  
22 problems with this site is this fuel cell was

1 tripping off a third of the time. It is like  
2 voltage regulations and the tightness of 1547  
3 tripped it off, and then it takes several  
4 hours to bring back up.

5 I think we get a lot of bang for  
6 our buck. If this system islands and the fuel  
7 cell doesn't trip off, we have suddenly done  
8 a lot of peak-shaving and a lot of efficiency  
9 improvement because it is a CHP system. But  
10 this is showing how diesels and PV and fuel  
11 cells can all work together.

12 Now I am involved with three  
13 military projects which are trying to look at  
14 the CERTS world. One is at Fort Sill. It is  
15 sort of what I call a hybrid. It is really  
16 pushed by the facility, the camp commander.  
17 These are sort of in their budget trying to  
18 figure this out.

19 And I am a little bit disappointed  
20 because it is one I call a hybrid CERTS,  
21 unlike the jail. This happens to be that  
22 there is storage. The military doesn't want

1 you to run your synchronous generators, which  
2 are natural gas, because they get penalized on  
3 the facility output of CO2. And so, this  
4 system is designed to island only on the  
5 battery and then bring the generation up.

6 So, what we are doing is we are  
7 going to make the battery function on the  
8 CERTS algorithms, but the generation is going  
9 to take the traditional paralleling P-Q type  
10 of controls that are available all over the  
11 place for backup generation. So, we are sort  
12 of showing the mixture of these two type of  
13 things. Obviously, control failure will take  
14 down the microgrid, except the battery can  
15 probably hold it up, if it has enough charge.

16 This middle one is through the  
17 Corps of Engineers. It is really an academic  
18 one. There's three universities, Notre Dame  
19 and Illinois and Wisconsin, and they are  
20 looking at advanced distributed control  
21 concepts, and I think some real interesting  
22 stuff, trying to anticipate failure,

1 anticipate what is going to happen.

2 And so, it is relying on the CERTS  
3 algorithms for the first few cycles. But,  
4 then, depending how should redispatch the  
5 system, based upon -- a phrase we like to  
6 say -- you know, the commander's priority.

7 And the last one is at Maxwell.  
8 This is with Sandia. There, there's two  
9 existing diesels, and they are reconfiguring  
10 things, so they can have the diesels operate  
11 these two buildings in a microgrid. And we  
12 will put CERTS microgrid algorithms on the  
13 generators to see whether they can do that,  
14 but there will be no fast islanding or stuff  
15 like that.

16 CHAIR COWART: Are you getting  
17 ready to close up?

18 MR. LASSETER: Yes.

19 CHAIR COWART: All right. We're  
20 running out of time.

21 MR. LASSETER: And this is the  
22 things that Merrill talked about we are

1 dealing with now. At AEP, we are going to  
2 show how we can make synchronous generators  
3 work, how we make storage work, how we make  
4 photovoltaics a member of the CERTS algorithm,  
5 rather than a constant power source. We have  
6 already demonstrated mechanical switches, and  
7 we are working on intelligent load-shedding.

8           And I will stop with this slide.  
9 This goes back to the big picture. Think  
10 about microgrids as a grid resource. Most  
11 grid resources either are a generator or a  
12 load. A microgrid to the utility can look at  
13 both. It will have internal stability. We  
14 don't have to worry about that.

15           So, all you really need to know  
16 from the microgrid is how much available P and  
17 Q can be provided or what kind of load you can  
18 provide, how much you can back up a load, all  
19 based on the minute-to-hour type of concept.  
20 And I think that is an important concept.

21           MR. BIALEK: So, I will try to be  
22 pretty quick here.

1                   You have heard about microgrids,  
2                   what they are, what they aren't. I think one  
3                   of the things that you might ask yourself is,  
4                   though, why would a utility be interested in  
5                   this? So, I will try to give you a little bit  
6                   of perspective.

7                   We are doing several things around  
8                   microgrids. We will talk about those. But I  
9                   think one of the things I want to point out is  
10                  -- go to the next slide -- this is really to  
11                  try to wake you up. This comes out of our  
12                  Smart Grid Roadmap that we had to do. But if  
13                  you look at that little star down there,  
14                  basically, when we look at sort of a Smart  
15                  Grid vision in the longer-term, we ultimately  
16                  look and say microgrids and our technologies  
17                  give the customer more reliability options.

18                  So, we are really saying here that  
19                  we believe down the road -- and why do we  
20                  believe down the road? Here is an example of  
21                  a home with a Smart meter, with a home area  
22                  network, with a pool pump, with air

1 conditioning, electric vehicle, some PV on the  
2 roof.

3 I think, Michael, you talked  
4 yesterday about sort of game-changers. We are  
5 starting to see homes that start to have these  
6 types of functionality. And so now, assuming  
7 that that home has a controller -- let's just  
8 say, for example, Bob's CERTS controller,  
9 built into this home. Could this particular  
10 home island ride through outages, if they  
11 wanted to? The answer is yes.

12 And so now, you look at that and  
13 say, as the prices of PV systems drop, as  
14 electrical vehicles proliferate, as GE and  
15 Whirlpool and Bosch, and all the others, come  
16 up with their Smart appliances, you now start  
17 looking at scenarios where customers, via  
18 their choice, decide to be able to do this.  
19 And it provides them an additional level of  
20 functionality.

21 I mean, one of things that, given  
22 the Southwest power outage, customers

1 generally told us that they thought we did a  
2 really good job in responding and bringing  
3 power back quickly, but the issue was on  
4 claims around things like  
5 refrigeration/spoilage of food.

6 So, if you think about what that  
7 really means, if I have something like this  
8 and I have got enough storage, and I have done  
9 everything, I might be able to actually ride  
10 through some of these particular events.

11 Part of the question becomes, when  
12 you talk about a microgrid -- and we will talk  
13 about the design features -- it is, how long  
14 do you really want to go? Do you want to go  
15 for hours? Do you need to go for hours? Do  
16 you just want to ride through the brief  
17 interruptions that would occur?

18 So, we do have some projects.  
19 Really, this is a layered project with DOE  
20 funding as well as CEC funding. And as  
21 Merrill mentioned, this is an RDSI  
22 solicitation award. So, really looking at

1 integrating and leveraging various generations  
2 of storage configurations, reducing the peak  
3 load.

4 And, really, one of the key  
5 distinctions here is enabling customers to  
6 become active participants by managing their  
7 energy. It is price-driven load management.

8 So, here at a very high level --  
9 and for those of you that have worked in the  
10 utility world, really what we are really  
11 saying here is think about how we operate the  
12 utility today. You are really now sitting  
13 there saying, from a utility perspective, I am  
14 going to apply the same types of systems or  
15 same types of criteria to actually look at  
16 managing this local microgrid. And I hope I  
17 do it is an open question, whether it be CERTS  
18 algorithms or other types of systems, but you  
19 are really ultimately looking at what is the  
20 boundary of this microgrid.

21 You know, you talk about  
22 industrial customers, campuses, substation

1 circuits, and we will talk about what we are  
2 doing. You are really back to this load  
3 generation balance. What reliability do you  
4 really want?

5 And one of the key things here is  
6 really define/determine what the seamless  
7 transition needs to be. So, that is really  
8 sort of the key here because, can you  
9 withstand a 3-second outage, short momentary?  
10 Would most customers like a 3-second outage  
11 versus an hour outage? Probably. Does it need  
12 to be seamless from a zero-interruption  
13 perspective? Maybe if you have got a data  
14 center, but then you probably have a UPS  
15 already. So, that becomes important.

16 And then, you look at defining  
17 what the loads are, determining how long you  
18 want to really island this particular system  
19 for. And then, ultimately, defining whatever  
20 generation you need to have.

21 So, for the project that we have,  
22 we are actually doing this project at Borrego

1 Springs. It is a desert community.

2 But one of the real key strengths,  
3 a progressive community, a high concentration  
4 of customer-owned solar. It is fed by a  
5 single radial transmission line. So, anytime  
6 that there is maintenance on the line or we  
7 get lots of lightning through that area, that  
8 whole substation will go out and customers  
9 will experience outages until we have  
10 patrolled the line and actually re-energized  
11 the line. So, it is a single 69 line feed  
12 into in that substation.

13 And one of the keys is that it is  
14 typical of our service territory. We really  
15 want to look at how we can extend this to the  
16 rest of our service territory.

17 One of the beauties of wonderful,  
18 little Borrego there is actually it is hot.  
19 You can see up there 120 degrees Fahrenheit at  
20 1:50 in the afternoon; a single radial  
21 station.

22 The interesting thing about that

1 is that is 50 degrees Celsius. We looked at  
2 sodium sulfur batteries. Interestingly,  
3 sodium sulfur batteries run really hot. The  
4 power electronics are in the bottom, and they  
5 aren't rated for 50 degrees Celsius. If we  
6 buy a sodium sulfur battery and used it out  
7 here, we would actually have to build a  
8 building and put it in air conditioning. Kind  
9 of an interesting little fact.

10 (Laughter.)

11 So, here's some rooftop PV that is  
12 out here. But we also have some fairly large  
13 ground-mounted PV that is actually going in as  
14 well. So, not surprisingly, lots of renewable  
15 resources here.

16 Project components: so you can  
17 see here DER and VAR management. You've got  
18 two 1.8-megawatt diesel Cat generators that  
19 are actually now, Merrill, out there.

20 We have got the capacitors that we  
21 are converting to SCADA to actually be able to  
22 optimize what the voltages on the circuits

1 that are feeding this.

2           Advanced Energy Storage around  
3 both a commercial substation-sized facility as  
4 well as community and/or neighborhood-sized,  
5 as well as even in the home, as part of this.  
6 So, storage at various levels.

7           And then, when you look at it more  
8 from sort of an IT perspective, really around  
9 feeder automation, so this FLISR is really  
10 just basically sort of a self-healing  
11 capability that will be up there as well.

12           And then, one of the keys that  
13 sort of makes it a little bit different, and  
14 starts to go down this next path, is really  
15 this customer energy management/price-driven  
16 load management piece, where you are now using  
17 -- and I think Ralph and I were talking about  
18 using day-ahead type of information from the  
19 ISO to sit there and start looking at how we  
20 can actually leverage customers and their  
21 loads as resources to help us carry the load  
22 in and off at substation.

1                   And then, a microgrid controller,  
2                   in this particular case this controller will  
3                   actually be contained actually in the  
4                   substation yard and with our particular  
5                   vendor.

6                   So, here is a little different  
7                   view. Bob talked a little bit about this.  
8                   How do you do this? The question becomes, do  
9                   you actually put all the intelligence in the  
10                  individual devices or do you actually put it,  
11                  in our case, we are talking about we have got  
12                  an overriding distribution management system.  
13                  We have got a microgrid controller. That  
14                  controller will provide visibility into the  
15                  distribution management system.

16                  Price-driven load management is an  
17                  element of this. It talks, ultimately, to the  
18                  customers via their home area network. And we  
19                  also have their status system where we will  
20                  actually take more granular control of  
21                  devices.

22                  So, you can see here where we are.

1 We have got a whole pile of milestones that we  
2 completed. The next steps are really sort of  
3 the testing and installation of various  
4 components and demonstration of those  
5 components.

6 We have got a schedule here. Of  
7 course, we have got our sort of relevant  
8 piece.

9 I think, with that, you have heard  
10 a lot about microgrids. I think one of the  
11 points I would like to raise before I finish  
12 is, so why do we really want to do this?

13 Merrill talked about the military  
14 conference. We are meeting with the  
15 Department of the Navy tomorrow to talk about  
16 how they are looking at, because of the high  
17 proliferation of bases in San Diego, how can  
18 we assist the Navy in Smart Grid/microgrid  
19 kind of demonstrations?

20 We also see our customers being  
21 very active. I mean, I read your microgrid  
22 briefing paper. You talked about UCSD and

1 their facility out there. I know Byron Washom  
2 very well.

3 We asked them, during the  
4 Southwest power outage, "Were you able  
5 actually to island the system?" And they told  
6 us that it took them five hours to finally  
7 black-start their generators.

8 And then I started to ask them the  
9 next question, which was, "Okay, so now when  
10 you have to go back to parallel the grid, did  
11 you have to take an outage again?" And the  
12 answer was, "Yes, we did because we had too  
13 much load on our generators, and we weren't  
14 able to move them around to actually  
15 synchronize back to the grid."

16 So, the whole definition of what  
17 is a microgrid, not a microgrid, it is pretty  
18 clear beauty is sort of in the eye of the  
19 beholder sometimes. I know what UCSD's  
20 definition is and why it is what it is.

21 But we look at this and say  
22 microgrids are really in many respects an

1 alternative service delivery model under Smart  
2 Grid. DOE has got a lot of effort and focus  
3 on the dollar-per-watt, you know the SunShot  
4 Initiative. We have got 110 megawatts of PV.  
5 We have talked PV today, 14,000 installations,  
6 and that is increasing about 15 to 20  
7 megawatts a year. We have got 120 electric  
8 vehicles today in San Diego County.

9 We just see, with the energy  
10 policy goals of the State, a real driver for  
11 customers being able to have a choice and  
12 being able to do what they want to do. What  
13 we see is that we need to be proactive and  
14 understand how we can leverage some of this  
15 technology to actually provide them  
16 opportunities and empower them to make  
17 intelligent choices, and still be a resource  
18 for them.

19 So, with that, I will stop.

20 CHAIR COWART: All right. Thank  
21 you all very much.

22 Ralph, do you want to lead us now?

1                   MEMBER MASIELLO: Yes, we should  
2 start the roundtable discussion. Let me tee  
3 it off with a few questions for the panel as  
4 a group, in no particular organization.

5                   A concern I have heard from the  
6 ISO in the context of distributed generation  
7 is the interconnect standards for DG today in  
8 the U.S. are pretty much around safety and it  
9 disconnects on a fault. But if you have a  
10 transmission fault, and it pulls the voltage  
11 down for a cycle, you could imagine in the  
12 future thousands of megawatts of DG tripping  
13 off.

14                  So, one question with a microgrid  
15 is, therefore, do we need a fault ride-through  
16 capability? And then, related to that is --  
17 and this would even be a question for Dave at  
18 NERC -- is anyone looking at system stability  
19 issues, transient stability, voltage  
20 stability, when you have got thousands of  
21 megawatts of interconnected microgrids, say,  
22 capable of self-islanding in a cycle?

1                   Okay. The second question is, it  
2                   would seem that a key element of any microgrid  
3                   installation, say at a university or a  
4                   hospital campus, or the like, is building the  
5                   grid system and the integration of the  
6                   building automation systems. But I didn't see  
7                   B to G or building automation or open ADR or  
8                   buzzwords from that domain on those slides,  
9                   but I am sure it is included in your planning.  
10                  So, maybe could you speak to that?

11                  And then, a third and final  
12                  question, are there cost/benefit analysis  
13                  tools under development where you could go to,  
14                  say, a university campus and put together  
15                  here's the picture for you financially, the  
16                  justification, and the payback, and the rest  
17                  of it, as a planning tool?

18                  MR. BIALEK: Let me address the  
19                  last one first, and then I will jump to the  
20                  first one.

21                  Part of the requirements of our  
22                  actual program at the end is to provide a

1 cost/benefit analysis. So, we will be doing  
2 that for the project because one of the things  
3 that we are looking to do is, for us to go to  
4 our Commission and ask for permission to  
5 implement this in any sort of larger fashion  
6 will require some level of cost/benefit  
7 analysis.

8 To your other point around sort of  
9 transient stability, how these things island,  
10 non-IEEE-P1547-type requirements, it is funny  
11 you should speak about that because, clearly,  
12 for us, as a utility with all these PV and  
13 with Governor Brown's additional 12,000  
14 megawatts of PV that he wants to put out  
15 there, we have actually been in front of our  
16 commissions advocating for modifications of  
17 existing rules.

18 We believe sort of the IEEE  
19 P1547.8 draft or the German Grid Code types of  
20 systems are going to become imperative because  
21 of the issues you just raised. You don't  
22 really want 12,000 megawatts of distributed

1 energy resources all tripping off due to a  
2 transmission event. You want the ability,  
3 capability, flexibility.

4 Now that, of course, raises other  
5 issues about safety/protection with regards to  
6 islands, and that all has to be factored in.  
7 And I think when you look at that, it becomes  
8 an important element. When we think about how  
9 we will operate microgrids, you're right, you  
10 really do sort of need a new paradigm. I  
11 think we are headed down that road pretty  
12 quickly.

13 MR. LASSETER: I would like to say  
14 a little bit also on the stability issue and  
15 perhaps on building energy control. On  
16 stability, one of the main objectives of the  
17 CERTS microgrid was to deal with 1547 in a  
18 practical sense.

19 So, what happens is 1547 is net at  
20 the switch itself. Most of the time, at this  
21 point, we are consumer energy from the grid.  
22 So, there is not much problem with stability

1 of tripping off a lot of generation. We are  
2 tripping off some load, and the local  
3 generation is still providing the energy to  
4 that load.

5 Now, if you move to a point where  
6 you are starting to export a lot of energy  
7 from a microgrid, then whether you want to  
8 ride through or trip off becomes a very  
9 situational type of problem. But, at this  
10 point, we have shown that there are no  
11 stability issues based on the microgrid  
12 itself, and it might as well be an impedance  
13 load, as far as the utility is concerned. So,  
14 at this point, we have sidestepped that.

15 Now, at the jail project, one of  
16 the problems with 1547 tripping off that fuel  
17 cell, we are removing those types of  
18 protections on that fuel cell and letting the  
19 system at the interface switch start meeting  
20 those criterion. So, that will actually  
21 enhance the local facility. It is only going  
22 to be a load drop as far as the utility is

1 concerned. So, that is an example.

2 On building energy control  
3 systems, our intent is that is integrated into  
4 it. And about six years ago, Oak Ridge did an  
5 extensive report looking at how CERTS  
6 microgrids could be integrated into the  
7 building control system.

8 But, remember, we think of the  
9 control system optimizes the system relative  
10 to everything else that is going on and not  
11 dealing with any fast events. And so,  
12 everything we find, it is going to work out  
13 pretty well.

14 I believe at SMUD they are  
15 actually putting in a Siemens Energy Control  
16 System to be handling the building, both  
17 thermal and electrical and the machines and  
18 the storage.

19 MS. SMITH: And I will just add  
20 onto the cost/benefit question. As Tom said,  
21 the project that we are doing with San Diego  
22 at the end will be looking at some of those

1 cost/benefits as well as a number of the other  
2 projects. Of course, that is not going to be  
3 this year or next year.

4 I think you can do some studies  
5 and do some projections, but to take real data  
6 and analyze that. I know there's a lot of  
7 people out there claiming to have microgrids.  
8 I am not convinced there really are that many  
9 operational microgrids in existence right now.

10 So, as we start to deploy some of  
11 these, I think that is when we are going to  
12 start to get some of that data back. That is  
13 an aspect of most of the projects that we do.

14 Some of the projects I didn't talk  
15 about -- ad I know you used Pecan Street in  
16 your paper as an example. It is technically  
17 not a microgrid from the standpoint it won't  
18 be able to island, but that project and a  
19 number of others that we are funding like that  
20 that I would say are deploying technologies  
21 that would be of great interest to those who  
22 are looking at microgrids, we will have data

1 on those as well.

2 MEMBER MASIELLO: Okay. Why don't  
3 we start at this end?

4 MEMBER WEEDALL: So, a question  
5 for Tom. Obviously, one of the real  
6 conundrums for providers like yourself is what  
7 happens when you have got to be the provider  
8 in an emergency. Can you talk a little bit  
9 about what policies you guys are thinking  
10 about? I mean, it is one thing to do a  
11 demonstration and say, hey, you know, we'll be  
12 there, but if you are looking down the road  
13 and starting to think about these things are  
14 going to become a lot more common.

15 MR. BIALEK: Well, we think,  
16 ultimately, that as a utility to remain  
17 relevant, if you want to think of the longer-  
18 term, if you assume that some of these  
19 systems, a significant amount of these systems  
20 come into play, the question becomes, then,  
21 what is the role of the utility? And so, from  
22 sort of a policy perspective, we would

1 certainly like to be on the side where we can  
2 actually participate and enable some of these  
3 technologies as opposed to being on the  
4 sidelines watching as other people do it. So,  
5 that is certainly one of the drivers for us to  
6 do some of this work.

7 We also see opportunities, given  
8 some of the issues with regard to, for  
9 example, the firestorms that have occurred in  
10 the County, where we can actually be proactive  
11 from a providing community sort of level  
12 microgrids, where in the event of issues,  
13 people can actually go and aggregate, and at  
14 least have a place to stay where there is  
15 electricity.

16 I mean, one of the things that we  
17 saw, and I can tell you myself, is during the  
18 Southwest power outage, everybody was going,  
19 "I've got my cell phone. Oh, my battery is  
20 just about dead. Where do I go to plug that  
21 in and charge it?"

22 You know, there's some little,

1 practical kinds of things. Where can I go?  
2 What can I do? And we see that these types of  
3 activities become important. I think it looks  
4 at it from both a sort of best practices for  
5 the population as a whole as well as for  
6 perhaps individual customers.

7 And so, we just really, from a  
8 policy perspective, say we would like to  
9 participate. The customers do it on their  
10 own. They can. Obviously, UCSD is trying to  
11 do that. And what happens on the customer  
12 side of the meter is really the responsibility  
13 of the customer, but we would like to be able  
14 to actually participate.

15 MEMBER REDER: Tom, you mentioned  
16 this really changes the operational paradigm,  
17 which certainly you're right. What is the  
18 thinking in terms of planning tools and  
19 process and the implications? And then, a  
20 follow-on might be, what needs to be done in  
21 order to facilitate this down the road?

22 MR. BIALEK: So, you're right,

1 operationally, it is very different. When we  
2 look at the larger picture and say, whether it  
3 be from a transmission perspective or a system  
4 perspective, that is what we really, when we  
5 think about requiring modification of the  
6 rules around inverters, there is where we see  
7 that that needs to go. Because if you look at  
8 it from the bulk system level, you now get  
9 into the issues around what happens when there  
10 is a transmission event. So, that is  
11 important.

12 Now could you just repeat the  
13 second piece, Wanda? The second piece?

14 MEMBER REDER: Well, to the extent  
15 that planning tools, the end process doesn't  
16 necessarily, you know, incorporate this  
17 paradigm shift, what do we need to do right  
18 now in order to get it there?

19 MR. BIALEK: So, one of the  
20 challenges that we have actually is  
21 distribution planning, as you know, tends to  
22 be much more, what's the load? What is the

1 static sort of load flow? Let me look at the  
2 highest loading conditions. Let me look at  
3 the low loading conditions. And let me design  
4 the system around that.

5 Now what we have got is a  
6 different paradigm, where we have now all this  
7 inverter-based technology out there. We are  
8 doing a lot of work with various vendors  
9 around transient studies. So, a lot of the  
10 more traditional transmission-type studies, we  
11 are now finding that we need to actually do at  
12 the distribution level.

13 And the issue becomes, from a  
14 planning tool perspective, we have a GIS, and  
15 the question becomes, how do you translate the  
16 data that we have from a steady-state model  
17 into a transient model? That technology  
18 really doesn't exist in any real form or  
19 fashion. We are struggling to move there.  
20 So, clearly, that type of level of tools are  
21 important.

22 What is also important is the

1 actual ability of our planners to be able to  
2 model multiple disparate systems, and what do  
3 the models for the inverters look like, the  
4 controls, et cetera? Because I think, to sort  
5 of Ralph's point a little bit, what happens  
6 when these events occur, when hiccups occur,  
7 you certainly don't want in most cases, if  
8 there is an outage, for these systems to  
9 island on their own and re-energize the entire  
10 circuit.

11 Now can they island behind their  
12 point of common coupling to carry their own  
13 local load? If they are configured to do  
14 that, yes. If we are configured to allow that  
15 to happen, yes. But we want to make sure, and  
16 the planning tools really don't exist to  
17 accommodate that.

18 MEMBER KRAPELS: As the token  
19 entrepreneur on the panel -- (laughter) -- I  
20 had an opportunity to get into the microgrid  
21 space two or three years when I set up  
22 Viridity Energy with Audrey Zibelman. And I

1 was so impressed with the capabilities and the  
2 potential of microgrids. And we got it easily  
3 funded. I think Viridity went through its B  
4 round last December with Intel as one of the  
5 Viridity investors. It is really exciting.

6 And behind the stuff you guys  
7 talked about so capably is a tremendous body  
8 of technology providers, from Siemens to Intel  
9 to Oracle, that I think are knocking on the  
10 door of the electric industry.

11 And the point I want to make is  
12 more about business models. In the same way  
13 that 30 or 40 years ago we didn't think  
14 entrepreneurs could get into generation  
15 because it was too complicated, and now look  
16 at what entrepreneurs have done in generation.

17 Then, 10 years ago, we said  
18 entrepreneurs can't build transmission because  
19 it is too complicated. And we have built two  
20 or three merchant transmission lines, and we  
21 have worked closely and well with utilities to  
22 do that.

1                   And now I see microgrids beginning  
2                   to evolve almost on the IPP model. So, you  
3                   can have an independent microgrid development  
4                   company that takes the best of the various  
5                   technologies, goes to a customer like a  
6                   campus, and says, "I would like to install a  
7                   microgrid on your campus, and I will promise  
8                   to deliver the following products."

9                   And the products are a reduction  
10                  in the amount of peak energy use and,  
11                  therefore, I am going to claw back some of the  
12                  capacity revenues that I am having to pay you  
13                  now, and real-time pricing and power  
14                  purchasing, and all of the products that the  
15                  good folks at the ISOs have created for those  
16                  of us who can participate and demand response  
17                  and efficiency.

18                  And so, I think you will see in  
19                  the next couple of years a number of  
20                  independent microgrid initiatives with all of  
21                  the attributes of IPPs. So, liquidated  
22                  damages, financial responsibility, project

1 finance, 250-page power purchase agreement  
2 contracts, and all that stuff.

3 And that, to me, when I think  
4 about it 20 or 30 years from now, those folks  
5 will work with utilities, Tom, as we do now.  
6 Sometimes it gets a little irritating, but  
7 most of the time I think it is where  
8 innovation will come from.

9 And so, between the utilities and  
10 the independent sectors, I think this is  
11 really the most exciting thing we are talking  
12 about in these two days.

13 MS. SMITH: Actually, I would say  
14 we are already starting to see that now. I  
15 can think of a few. And I think it is sort of  
16 evolving from companies that have a microgrid  
17 system and then are starting to actually go  
18 beyond just being the technologist who  
19 supplies the system. And I think we are  
20 starting to see some of those situations on  
21 some campuses and bases.

22 MR. LASSETER: I think this is a

1 very promising direction. It is amazing, the  
2 variety of groups that call me sometimes.

3 But I think what we have to think  
4 about is, okay, we are finding a way to build  
5 these because there are some advantages to  
6 build them both for the customer and the  
7 contractor, the utility. But I think what is  
8 missing right now, which we may want to think  
9 about, is if we think of the microgrid as a  
10 resource both for the customer and the  
11 utility, what constraints do we want to put on  
12 it?

13 In other words, what does a  
14 distribution control system want to know about  
15 this? I don't think it needs to know about  
16 every inverter, but it needs to know, can you  
17 provide power or VAR support; what's the  
18 financial implications of that?

19 That needs to be grabbed hold of  
20 and move away from the details of the  
21 components, but saying, hey, this is a system  
22 with these following characteristics. What

1 does the utility need to know? What does the  
2 developer of this need to know?

3 And I think some good thought into  
4 that entity probably would be incredibly  
5 useful to make this not be quite as disruptive  
6 as it could be.

7 MEMBER KRAPELS: Have you looked  
8 at overseas applications of microgrids, the  
9 Germans and the Japanese and Singapore?

10 MR. LASSETER: I know of them  
11 existing, and I am reluctantly going to China  
12 for a microgrid concept, and I will find out  
13 more. But, actually, with some support of the  
14 Department, there has been an international  
15 group that meets once a year.

16 And I remember I went to the first  
17 ones and skipped a couple, and then one was in  
18 Greece. And I was overwhelmed. There was  
19 like a hundred people doing microgrids in  
20 Germany and another group of 20 from Japan and  
21 China and Korea. And I was just amazed at the  
22 amount of thinking that is going on all over

1 the world. I just can't keep up with them  
2 all. Maybe Merrill --

3 MS. SMITH: I can't keep up with  
4 them all, but we do have an international  
5 conference every year where we are able to  
6 share what various countries are doing in the  
7 microgrid space.

8 We are participating on CIGRE,  
9 which is looking at microgrids. I am not  
10 exactly sure how that is structured, but a  
11 subcommittee, or what have you on that with a  
12 number of international participants, and the  
13 sharing of data. So, we are aware of it.

14 I know the Chinese were just here  
15 looking at some of our microgrids. I think  
16 they visited UCSD campus.

17 So, we are aware of what is going  
18 on. And actually, the Japanese are doing  
19 several demonstrations here in the U.S., yes.

20 MEMBER HEYECK: A very interesting  
21 discussion. It brings back my memory of Pearl  
22 Street, which was, in essence, a microgrid.

1 So, where we are going is where we were.

2 (Laughter.)

3 But one of the things -- and Ralph  
4 is usually spot-on some of the technical  
5 issues -- voltage ride-through is going to be  
6 very important. But we really, really need a  
7 next-generation EMS system.

8 We need larger control areas to  
9 deal with the variability that this creates.  
10 This isn't just the flip of a light switch.  
11 It is the slip of an island.

12 And the paradigm is going to  
13 shift. So, as we become micro, we need to  
14 become larger with respect to controls because  
15 we need the law of large numbers to work.

16 The other interesting thing, as a  
17 game-changer really, has been shale gas. When  
18 you showed the unit with combined heat and  
19 power, you can have a smaller unit run some  
20 buildings from a combined heat-and-power  
21 perspective. Again, that is where we were way  
22 back when, and now we are going to go back to

1 that.

2 I can't help thinking, as folks  
3 get comfortable that gas won't be volatile, we  
4 still have the fracking issue that may bite  
5 us, but as gas becomes less volatile, we may  
6 see more of these units in a distributed way.

7 The last point I will make is the  
8 same point I made yesterday. The 21st century  
9 customer is really not going to accept any  
10 other SAIDI but zero.

11 As I went through my thought  
12 process of what I need to do to survive an  
13 outage, my most important item is my sump pump  
14 because outages occur during rainstorms. So,  
15 I have a battery backup to that.

16 My second most important item is  
17 my refrigerator because of what I store in  
18 there. So, you get to the point where the  
19 customer actually says, not that I have my  
20 home office, I have more people telecommuting,  
21 I am going to put a UPS in. And then, you can  
22 see the evolving, too.

1           But it is interesting, Merrill,  
2           your comment of 20 percent reduction in  
3           saving, I am just wondering if the customer  
4           really doesn't want a 20 percent reduction;  
5           they want something as close to zero as  
6           possible. So, that is really the challenge.

7           MS. SMITH: It was 20 percent or  
8           greater.

9           MEMBER DUNCAN: Tom, I'm from  
10          Austin. I'm President of the Pecan Street  
11          Project there.

12          I also was one of the reviewers  
13          with the Environmental Defense Fund that  
14          reviewed the Smart Grid deployment plans in  
15          California. And as you know, we gave your  
16          plan the highest score there.

17          And I just want to say how  
18          impressed I was with the extensiveness of the  
19          process you went through in your Smart Grid  
20          deployment plan. What impressed me the most,  
21          and it speaks to the issue that Wanda raised  
22          earlier about planning tools, is in the

1 process of doing that, you raised so many  
2 issues -- all the utilities did -- that had to  
3 be addressed in terms of integration, of the  
4 metrics that were involved, which became a  
5 contentious issue, as you know, getting into  
6 it, and so many of the consumer issues.

7           The reason I am bringing this up  
8 is, again, I think you all have the best Smart  
9 Grid deployment plan that I have seen in a  
10 utility. What really concerns me, however, is  
11 I know lots and lots of utilities that are  
12 doing what they call Smart Grid deployment,  
13 employing Smart meters everywhere, working  
14 with microgrids. And some of them confuse  
15 microgrids with Smart grids and such. I know  
16 lots of utilities doing that, and only a  
17 handful of utilities that have a real Smart  
18 Grid deployment plan.

19           I have become more convinced  
20 recently that what is most needed in this area  
21 is requiring the utilities to go through a  
22 Smart Grid deployment planning process to

1 address all the different issues that are  
2 being raised, both with microgrids, and  
3 microgrids are, of course, a subset of the  
4 bigger Smart Grid issue, the integrations  
5 there.

6 Again, I would just recommend to  
7 anyone who hasn't looked at it to look at your  
8 process you went through in the Smart Grid  
9 deployment plan. As much as we can replicate  
10 that process with other utilities around the  
11 country, it would address a lot of the  
12 different issues that we are facing in this  
13 Committee.

14 Thank you.

15 MEMBER DELGADO: As I hear you  
16 talk about this technology, the only thing I  
17 have to say is I wish I was involved in it  
18 because it looks like a lot of fun.

19 A concept comes to mind, and it  
20 links to some of the things that have been  
21 said. In the electric energy industry, there  
22 is a couple of concepts. One is that we have

1 to address the technical, and then we have to  
2 address the rules, the regulatory.

3 In the regulatory, usually, the  
4 question is who pays. And my understanding  
5 -- and there is a diversity around the  
6 different states -- is that there is a basic  
7 sense of service that everybody pays for, and  
8 anybody who needs premium service would have  
9 to pay for themselves.

10 I'm not surprised. I mean, we are  
11 oversimplifying the benefits besides the  
12 elegance of what you are doing, which amazes  
13 me. But besides that, reliability appears to  
14 be the driving force. Okay?

15 So, there are people who need  
16 reliability at an extremely high level, and I  
17 am not surprised that military facilities are,  
18 in fact, the drivers, for two reasons. One,  
19 they tend to have a great need for reliability  
20 and they don't seem to have a problem with  
21 money. You know, for reliability it can be  
22 paid because Uncle Sam prints the stuff and

1 that's their boss.

2           So, from that perspective, okay,  
3 the question, then, is, as we see more of this  
4 and we see people who do have a necessity,  
5 then what is your expectation? Have you  
6 looked at the policy broadside in a system  
7 where the bulk of the people really do not  
8 need that level of reliability?

9           And I don't quite agree with Mike  
10 because I think there is a great satisfaction  
11 with the system. Most people are more  
12 concerned with price than with any further  
13 improvement or reliability. That is, they  
14 have quite a bit of reliability for their use.  
15 As long as you don't black them out in the  
16 middle of a Packers game, they are quite  
17 happy.

18           (Laughter.)

19           You know, the beer stays cold even  
20 if the refrigerator is turned off for a while.  
21 So, it is not a problem.

22           Do you see my point? My point is

1       there is a policy issue here regarding  
2       implementation.  What is the perspective that  
3       you have on this?  I don't know which one of  
4       you -- have you given a look at that?

5                   MR. BIALEK:  So, we have filed a  
6       deployment plan.  Having said that, when you  
7       look at it I think in the long-term, you start  
8       getting into the whole discussion about what  
9       do rate structures look like; how do utilities  
10      recover their costs?  You do have the  
11      regulatory compact.  So, how does this all  
12      work out?

13                   But do you now get into the whole  
14      level of differentiated levels of reliability?  
15      And I think that that is a very real  
16      opportunity, a real changer.  It is something  
17      that typically, when we talk about that, I  
18      know our regulators look at us and say, "What  
19      do you mean you are going to provide different  
20      levels of reliability for different customers?  
21      All customers are equal."

22                   And you look at that and say,

1       okay, I can accept that. But, on the other  
2       hand, if someone says, "I want six 9s," and  
3       they are willing to pay for six 9s, why  
4       shouldn't provide the six 9s and charge them  
5       for that?

6                   And somebody that wants three 9s,  
7       just because they really don't care, well,  
8       obviously, they are going to get some base  
9       level of reliability because we are not  
10      necessarily going to go start pulling  
11      equipment out to provide three 9s.

12                   So, I think long-term, yes,  
13      differentiated levels of reliability should be  
14      a service that the utilities should be able to  
15      offer.

16                   MEMBER CURRY: I would like to  
17      sort of follow Jose's point. Looking at New  
18      York as an example, where basically in  
19      Manhattan we have a pretty high degree of  
20      reliability, and the cost of that is  
21      socialized throughout Con Ed service charge  
22      rate.

1                   But, as has been the experience of  
2 many of you in many different states, there  
3 has been a separation of generation and  
4 distribution. In that process, the ratepayers  
5 who paid for the generation were paid for its  
6 disposition to the private sector. There's a  
7 lot of money changed hands when Con Ed had to  
8 shut its plants, or whoever else did upstate.  
9 Niagara Mohawk, et cetera, were only too glad  
10 to get out of there because it almost killed  
11 them.

12                   But, at the end of the day, in  
13 jurisdictions where you are not dealing with  
14 the separation of generation and distribution,  
15 it seems to me -- again, maybe because of my  
16 limited engineering understanding -- that you  
17 are essentially cannibalizing the system. You  
18 are diminishing the value of the generating  
19 assets by substituting in a microgrid setting  
20 potential generation, let's say, on the  
21 autonomous basis. You are essentially  
22 cannibalizing the system that other people

1 have paid for.

2           So, from a reliability standpoint,  
3 to the extent that the system is backstopping  
4 microgrids in any jurisdiction, to the extent  
5 you are cannabilizing the value of the  
6 already-paid-for generation, is there any  
7 thinking abroad right now -- you know, you  
8 guys are looking at this from an engineering  
9 standpoint; I am not expecting a financial  
10 answer -- but can you point me in some  
11 direction where I can get at some of these  
12 issues?

13           Because, ultimately, when we had  
14 the vision displayed yesterday and someone  
15 suggested we need a big arrow going from right  
16 to left, and it would be red, and it would  
17 basically change the color of all those other  
18 arrows for a while, getting this right  
19 financially is terribly important because you  
20 are essentially attacking shareholder equity.

21           I guess enough said. I think  
22 there is some financial, to use a bad term,

1 financial engineering that has to be thought  
2 through to be able to afford the really  
3 terrific stuff you guys are doing from a  
4 straight electrical engineering standpoint.  
5 I mean, I think what you are trying to do is  
6 admirable. I would like to be able to maybe  
7 help a little bit in looking at the  
8 regulatory/financial aspects.

9 MEMBER MASIELLO: Tom, did you  
10 still want to ask a question or did you put  
11 your card down?

12 MEMBER SLOAN: Jose and Bob kind  
13 of were picking up on what I was thinking.  
14 And that, in more simplistic terms, is there  
15 was a real push for net metering; i.e.,  
16 letting the small ratepayer subsidize the  
17 bigger guy who could afford to go off grid.

18 Moving from the reliability  
19 components of a microgrid, which a utility can  
20 help manage, to that being an independent  
21 aggregation with an independent power source,  
22 again, is going to have customers fleeing the

1 traditional utility and the rate of recovery  
2 of investments and affordability of  
3 electricity begins to become a concern to me.

4 The issue of the gas supply from  
5 fracking I think yesterday, or maybe it was in  
6 my last meeting the day before, that we were  
7 discussing, if we have a surplus of gas, it  
8 goes as CNG on the international market, which  
9 then changes the pricing of gas to an  
10 international commodity, which is much higher  
11 and impacts, then, the viability of these  
12 microgrids.

13 So, I guess I am looking at the  
14 Department not only to be supporting --  
15 because I am not an engineer -- to me, really  
16 exciting technological innovations, but also  
17 helping commissions and the public  
18 policymakers and the utilities understand what  
19 the impact is going to be on the ratepayers,  
20 on the utility, on that provider of last  
21 resort.

22 In the telecommunications

1 industry, we are already seeing the wireline  
2 companies becoming less relevant  
3 technologically, and trying to figure out how  
4 you transition them into making automobiles  
5 from buggies, I mean, how do you maintain that  
6 infrastructure or how do you transition  
7 customers out of that?

8 MEMBER MASIELLO: I'm glad you  
9 brought that up because I was going to bring  
10 the cell phone analogy up next.

11 But speaking to Ed's comments, the  
12 Viridity Model doesn't require that the  
13 microgrid be able to island. So, there is an  
14 economic case for it in many places without  
15 the reliability issue.

16 And that leads you to this horse  
17 has left the barn. The regulatory process  
18 isn't going to impede it, and you don't need  
19 federal money to stimulate the Snyders and  
20 Johnsons from innovating and bringing  
21 products, right?

22 So, it is not hard to see a future

1 where increasing percentages of load is  
2 basically cannibalizing the system, right?  
3 And we need a roadmap for that.

4 So, we will give Pat the last  
5 word, I think, or Richard.

6 CHAIR COWART: Actually, I have a  
7 couple of questions. This conversation does  
8 make me think, Ralph, that this is a very  
9 appropriate topic for this Committee. That is  
10 seeming increasingly obvious.

11 I actually have two, one very  
12 large-scale question. I am just asking, I am  
13 polling your visions, frankly. And then, I am  
14 going to follow up on the regulatory question  
15 that you brought up, Tom.

16 The regulatory question is the  
17 more straightforward one, which is, how do you  
18 see it unfolding in the debate between the  
19 regulated utility, sort of monopoly wires  
20 company, becoming a provider of microgrid  
21 packages of services versus the alternative  
22 model which is, "Uh-uh, you don't do that;

1       you're a monopolist. Let's let a thousand  
2       flowers bloom."? And we are going to keep you  
3       out of that business, and there is going to be  
4       competition on that.

5               And I will tell you my second  
6       question. You might want to answer that as  
7       well. I see competing divisions/debates about  
8       the future of the grid pretty much everywhere.  
9       There is a raging debate in Germany right now,  
10      for example, over the vision for the future of  
11      the grid.

12             On the one hand, you have -- well,  
13      there may be three different models -- on the  
14      one hand is millions and millions of  
15      individually Smart-metered applications.  
16      Everybody is just on a Smart meter, and there  
17      is a central controller system, basically,  
18      that is controlling everything.

19             Then, there is this microgrid  
20      model, which is a lot more autonomy, behind  
21      clusters of users or uses. And then, there is  
22      the point, also, that Mike brought up a minute

1 ago, which was, as we think about an  
2 increasing penetration of renewables, in  
3 particular, on this system, we need larger  
4 balancing areas, and we need much more  
5 transmission in order to connect a lot of  
6 remote, larger generation sources to the  
7 network that is at the other end, whether it  
8 is just gazillions of Smart meters or whether  
9 it is like a combination of that and  
10 microgrids.

11 So, do you see the future of the  
12 power system being much more distributed or,  
13 simultaneously, much more integrated across  
14 larger geographic regions, or what?

15 MR. BIALEK: So, let me address  
16 sort of the regulatory rate recovery piece.  
17 I think if you look today in our general rate  
18 case filing, GRC Phase 2, in our GRC Phase 2  
19 we have requested implementation of a  
20 residential demand charge to try to get at the  
21 point that I think has been raised; part of it  
22 has been raised here, which is people are

1 leaving. How do you recovery your cost  
2 without unduly burdening those who cannot  
3 afford the PV system?

4 So, we have already taken that  
5 step. So, we have done -- that filing is in  
6 front of our Commission today.

7 And what exactly will that look  
8 like in the future? We don't know. And it  
9 may be not just a kilowatt component, but also  
10 a kilobar component. So, we think longer-term  
11 the rate structures need to change. How we  
12 recover our authorized rate of return needs to  
13 change.

14 As far as where we see the future,  
15 we truly believe that in the end it is going  
16 to be a much more distributed architecture  
17 than what it is today. If Governor Brown's  
18 new proposal comes to fruition, we are going  
19 to have another 12,000 megawatts' worth of  
20 distributed renewables on our system in  
21 California. And that is a large number.

22 And so, inevitably, you are going

1 to end up with a distributed architecture.  
2 And I think, Michael, you mentioned this  
3 yesterday, around more of this -- so, it is  
4 going to come to a certain point; I don't know  
5 how far it is going to go or not, but  
6 certainly it is going to take time to evolve.  
7 It is not going to be instantaneous.

8 And you may end up with, again,  
9 really some sort of hybrid model at some  
10 point, where you have got at the high level  
11 larger systems with more integration, but you  
12 also have it very distributed at the local  
13 level.

14 MS. SMITH: Can I just have a  
15 thought about the cannibalization of the  
16 system? I think you kind of also -- I am not  
17 saying that every microgrid would not fit that  
18 case, but I think there's a number of them  
19 that would not fit that case.

20 I mean, I think the Borrego  
21 Springs, I don't think San Diego Gas and  
22 Electric is putting that system in place

1 because it is a nice, cute, little community  
2 that they want them always to have their  
3 lights on. There was a monetary incentive for  
4 doing that as opposed to doing something else  
5 that could be more costly in order to do the  
6 things that needed to be done to the system.

7 And I think we are seeing that in  
8 a lot of the examples of the microgrids that  
9 we are putting in place, that those particular  
10 users want something that can't be supplied by  
11 the system, and they are not actually taking  
12 away from the system or not utilizing the  
13 system there. They are just adding on.

14 MEMBER CURRY: The analogy,  
15 though, to cellular is apt here because we in  
16 New York, we still have copper wire service to  
17 places as remote to us as that desert town is  
18 to people in California, because there is no  
19 cell service.

20 I have proposed, somewhat  
21 facetiously, that everyone gets an uplink for  
22 \$50,000 who wants one out there, and the cell

1 people give it to them, and that is their  
2 price of getting out of the copper wire  
3 business.

4 But, really, what I was trying to  
5 address with my financial question is the  
6 regulatory paradigm: how do we look at this?  
7 Because, as Sonny knows, and as the comments  
8 in which he quoted our Chairman yesterday as  
9 saying there are a million customers in New  
10 York that are 60 days or more behind on their  
11 electric bill.

12 There is a glass distinction  
13 likely to occur with this great improvement.  
14 And unless we think through the regulatory  
15 paradigm as we go into it, engineering and the  
16 competence that you all have articulated so  
17 clearly today is going to get so far ahead of  
18 the regulatory structure, it is going to get  
19 really, really messy.

20 And I took the worst case, which  
21 is a state where you still have got generation  
22 socialized as well as distribution socialized.

1 In California, you don't have that problem  
2 anymore. We don't have it in New York.

3 But if you think that the utility  
4 industry is slow to move, you know, you have  
5 met your regulators; we are even slower. So,  
6 it needs some thought, and anything that  
7 anyone around this table has that can point me  
8 in the right direction, I am willing to  
9 undertake trying to get something moving.

10 And I am not necessarily thinking  
11 of NARUC. I am thinking of going to the  
12 rating agencies. I am thinking of going to  
13 people who make money from this business and  
14 make them think a little bit once in a while,  
15 instead of just collecting a fee.

16 SECRETARY HOFFMAN: Bob, you bring  
17 up a good point. I think it is something that  
18 we should tackle and find a way to do this.

19 Tom, Bob, Merrill, great  
20 presentations. I think this is an important  
21 topic.

22 One of the things that I look at

1 is you used the appropriate word, the future  
2 evolution of the utility, and what is the  
3 business model for a utility in the future,  
4 recognizing what Mike brought on pay attention  
5 to the customer and what is the customer  
6 expectation.

7 I will say to Jose and Mike's  
8 point on the debate of the customer, I think  
9 customers are fickle and it can be any sort of  
10 preference of the day that they will flip,  
11 depending on what their interests are.

12 But one of the things that I had  
13 been struggling with is the microgrid had  
14 always been termed a customer-oriented term.  
15 I actually like the ownership by the SDG&E,  
16 Tom, in saying, look, this can be a utility  
17 term in how we are doing our business model  
18 and how we are looking at utilities in the  
19 future.

20 And I have been trying to say we  
21 need more layer of control. I think I like  
22 the word "granular" control. But going back

1 and saying, strengthening the role of the  
2 distribution utility and how they are going to  
3 have a business model in the future. I think  
4 that is one of the important topics that we  
5 can look at and continue to investigate  
6 because that is going to be the fundamental  
7 principles under which we have to look at what  
8 is the regulatory structure; where do we want  
9 to go?

10 To Roger's point, I am going to  
11 back off. I like the term Smart Grid, but I  
12 think utilities need to do a five-year plan.  
13 Having the Smart components as a part of it,  
14 you know, we tend to get coined with a lot of  
15 terminology, whether it is microgrid or Smart  
16 Grid. But, I mean, we really need to do that  
17 business model kind of development and have  
18 utilities take a hard look within their  
19 regulatory framework, within what they are  
20 allowed or not allowed to do. How is the  
21 business model going to evolve?

22 I found it very interesting and

1 something to key on here is that we do have  
2 critical loads, critical assets. Not all  
3 loads are equal. And as we look at  
4 reliability and different levels of  
5 reliability, how can we play off of that in  
6 looking at being able to manage critical loads  
7 and critical assets on the system?

8 And I think that is really some of  
9 the things that are going to evolve from this  
10 discussion and doing that. I found that we  
11 will take it back for some tool development,  
12 and going back to the visioning exercise on  
13 some of the distributions, which I think still  
14 need to be worked on.

15 It does come down to I think we  
16 need to look at, how do we do expectations  
17 with policy, with regulatory? You know,  
18 paying for things on a 50-year term kind of  
19 assets, we are going to have to really take a  
20 hard look at that. I don't think some of  
21 those regulatory models still stand.

22 And so, a very good discussion,

1 and I thank you all for this discussion.

2 MEMBER VAN WELIE: Yes, Pat, it  
3 just occurred to me, and had it occurred  
4 earlier, I would have put my card up earlier.  
5 But I think there is an opportunity here for  
6 the DOE and the FERC to work together more  
7 closely.

8 The FERC is creating some fairly  
9 substantial incentives through a number of  
10 mechanisms. The past few years, many of the  
11 ISOs have allowed DR to play through the  
12 capacity markets. And just recently, FERC  
13 came out with Order 745, which would pay DR  
14 sources the full LMP.

15 Typically, in a classic economic  
16 sense, the consumer would look at the benefit  
17 coming from avoided consumption as being the  
18 only incentive for making an investment.  
19 Whereas, now what the FERC is saying, you get  
20 to keep that and, in addition, I will pay you  
21 the full LMP for the balancing service that  
22 you are providing the group.

1                   So, there is a much bigger  
2                   incentive now for people to invest in  
3                   microgrids because microgrids are really just  
4                   another form of DR. And so, as the FERC and  
5                   ISO world looks to move towards DR, and the  
6                   model there is the aggregation model, I think  
7                   there is an opportunity there for sort of  
8                   closer collaboration between the two agencies  
9                   in terms of figuring out not only the  
10                  technical issues, but also, as has been  
11                  pointed out around this table, the cost  
12                  allocation issues.

13                  Because the people investing in  
14                  these microgrids are doing it in some cases  
15                  from the point of view of a cost avoidance  
16                  strategy. Many public power agencies, I know  
17                  in New England, are looking from that  
18                  perspective.

19                  And so, then, the question is, if  
20                  from a federal point of view you are wanting  
21                  Richard's point, to look at decarbonizing the  
22                  economy, electrifying the transportation

1 system, you are going to need a strong grid.  
2 And somebody is going to pay for that strong  
3 grid, and half your customers are disappearing  
4 into microgrids. So, how do you sort of deal  
5 with that cost allocation problem?

6 CHAIR COWART: All right. Well, I  
7 want to echo what Pat said to the panelists.  
8 You guys really gave us a lot to think about,  
9 and we appreciate that very much. Thank you.

10 You don't need to go anywhere  
11 unless you actually want to sit in a different  
12 chair.

13 (Laughter.)

14 Ralph, which would you prefer? It  
15 seems like this will be a good time to take  
16 our break now. It is scheduled in a few  
17 minutes anyway. Okay. Take about 10 minutes  
18 and then we will come back and talk about the  
19 paper.

20 (Whereupon, the foregoing matter  
21 went off the record at 9:56 a.m. and went back  
22 on the record at 10:16 a.m.)

1 CHAIR COWART: Would Committee  
2 members please take your seats?

3 Our next topic is the Framework  
4 White Paper developed by the Storage  
5 Subcommittee. And for this again, Ralph,  
6 you're on.

7 MEMBER MASIELLO: But once we are  
8 through this, I will shut up for the rest of  
9 the day; promise.

10 Last February or so, Pat requested  
11 that we prepare something on the issue of  
12 valuing storage. And so, we have this paper.  
13 I apologize that it is not as here's the  
14 document ready to go. It still says "draft".  
15 But I am hoping we can clear that up today.

16 There was one paragraph on page 3  
17 that the Subcommittee couldn't agree on  
18 because I was obstinate. Gordon has in the  
19 past week persuaded me I am wrong.

20 So, the bottom paragraph on page  
21 3, continuing over to page 4, we will strike.  
22 And that was arguing for a congestion capacity

1 market for storage.

2 So, I think, with that, the  
3 Subcommittee is saying, as far as this is  
4 concerned, this is ready to go.

5 But I hope everyone has read it.  
6 I would like to call out, in particular, the  
7 recommendations that begin on page 8 as the  
8 meat of the nine points that are where our  
9 discussion should focus, I hope.

10 It says "Draft Estimating the  
11 Value of Electricity Storage Resources,"  
12 10/3/11.

13 SECRETARY HOFFMAN: Before we get  
14 started, Gordon, can you tell me where you  
15 were heading with the congestion capacity?  
16 Because I have to admit that was one thing  
17 that I looked at and I said, oh, interesting.

18 MEMBER VAN WELIE: Yes. So, I  
19 will try to do a summary version of the  
20 torture I subjected Ralph to.

21 I guess the implication of a  
22 congestion capacity product is that somehow

1 the market or the ISO should solve the  
2 congestion. And my argument would be  
3 congestion is really a price signal that is  
4 reflecting a transmission constraint or a  
5 dispatch efficiency. And the statement in  
6 that paragraph that the market won't get the  
7 benefit of that, I think sort of as a starting  
8 point it is incorrect.

9 If you look at congestion, some  
10 benefit and some don't. So, the incumbent  
11 generator is actually benefitting because they  
12 are getting dispatched and they are getting  
13 their price, and so forth.

14 The people who are losing in that  
15 situation are consumers. And so, that price  
16 signal is really a signal to the consumers  
17 affected by that congestion to do something  
18 about it, or the agent, acting on behalf of  
19 those consumers, to do something about it.

20 There are two ways of addressing  
21 congestion. The one is through a financial  
22 hedge, like a financial transmission right,

1 and the other is to make some kind of  
2 infrastructure investment. And really, only  
3 when the cost of the alternative rises or is  
4 less than the cost of the congestion will the  
5 consumer or their agent be incented to  
6 actually do something about it.

7 And I think this discussion we  
8 have just been having around microgrids is a  
9 really great case in point. Were it not for  
10 that congestion signal, the person sitting in  
11 that load pocket might not see the financial  
12 incentive to actually go and make the  
13 investment in the microgrid.

14 So, the thing I was objecting to  
15 was the notion that somehow the ISO should be  
16 solving the very problem it is signaling.  
17 That is the ISO stepping into the market.  
18 Whereas, what the ISO is trying to do through  
19 the market design is create a price signal for  
20 the marketplace, or in this case the  
21 consumers, to go off and do something about  
22 it.

1                   MEMBER MASIELLO: With that, if  
2 people have had the chance to read it, do they  
3 have comments? Richard?

4                   CHAIR COWART: I have just one  
5 comment.

6                   MEMBER MASIELLO: Okay.

7                   CHAIR COWART: As far as it goes,  
8 I think the paper is very strong and I like  
9 it. And I will confess that I was questioning  
10 the same point that Gordon was just speaking  
11 to.

12                   The other point that I think just  
13 needs to be mentioned here, and it probably  
14 should be a high-level mention, is something  
15 that came up in our last meeting about  
16 storage, which is that it is important, also,  
17 for us in policy terms to be thinking about  
18 thermal storage and managed charging of  
19 vehicles as performing a lot of the services  
20 that we think of when we think of storage.

21                   That is, if we are looking for  
22 systems that will take advantage of variable

1 renewable resources when load is low, we ought  
2 to be thinking about storing that value in hot  
3 water heaters, icemakers, and charging  
4 vehicles in the middle of the night, that kind  
5 of thing.

6 And that those functions are  
7 functions that sound a lot like storage. We  
8 are actually storing the electricity in a  
9 different form, and it is not going to come  
10 back to the grid as electricity.

11 That is actually the dominant, is  
12 likely to be the dominant way in which we use  
13 off-peak generation resources that would  
14 otherwise be wasted.

15 So, I am not sure, I didn't write  
16 the sentence that would say this, but I think  
17 that any discussion of storage needs to  
18 acknowledge that parallel use of the  
19 resources.

20 I mean, I get it that there is  
21 this big difference between electricity  
22 in/electricity out versus electricity

1 in/energy out.

2 MEMBER ROBERTS: But it still  
3 benefits the grid.

4 CHAIR COWART: It still benefits  
5 the grid. It performs many of the same  
6 functions. It is soaking up excess low-  
7 emission or off-peak generation of any kind.

8 And it is the sibling of what we  
9 are talking about here and needs to be  
10 acknowledged as an important part of it.  
11 That's all.

12 Is there a way of getting  
13 agreement that we can say that?

14 MEMBER MASIELLO: Yes, we can add  
15 a sentence that talks about these. As a  
16 group, we deliberately decided not to address  
17 electric vehicles, because there was another  
18 effort going on.

19 And thermal storage and electric  
20 vehicles aren't utility- or grid-connected  
21 applications, right? They would fall under  
22 the consumer storage, right?

1                   But we can add the sentence that  
2 points out they are there; they are a critical  
3 element.

4                   All of this blurs, you know. It  
5 is demand/response; it is storage. If it  
6 doesn't come back as electricity, I guess it  
7 wasn't within our intent. Let me put it that  
8 way.

9                   CHAIR COWART: That's certainly  
10 acknowledged.

11                  SECRETARY HOFFMAN: I guess I will  
12 say real quick, Ralph, thank you. This was  
13 actually where I was heading in some of the  
14 things that I was looking for in trying to  
15 frame the issues, as you look at the different  
16 market structures.

17                  And I guess I go back to Gordon's  
18 constant reminders of the services, and what  
19 are the competing products for those services  
20 we are looking at? And I think it is an  
21 important attribute that it has to be cost-  
22 competitive or you have to look at the

1 technology and make sure that it can provide  
2 the services, basically, for the least cost or  
3 market-competitive.

4 As I went through the paper, I am  
5 still struggling with congestion. I know that  
6 market sets the signal. But from DOE's  
7 perspective, we have been writing this  
8 congestion study paper, you know, and doing an  
9 analysis that hit in 2006 and 2009, and we  
10 will do another one in 2012.

11 And it seems like we still haven't  
12 resolved congestion. So, the markets are  
13 dealing with it, and they set prices, but,  
14 yet, there is no resolution to it.

15 I guess I struggle with that  
16 concept, and I haven't yet to figure out --

17 MEMBER VAN WELIE: Yes, I will  
18 just give you the way I think about it at  
19 least. I think congestion -- I used the term  
20 last night over dinner -- it is a bit like a  
21 toothache. And so, when it is a mild  
22 toothache, maybe you can live with it. But a

1 bit of congestion is not necessarily a bad  
2 thing. It might actually be the most economic  
3 result, to live with that congestion.

4 Typically, as congestion rises,  
5 though, eventually what emerges is a  
6 reliability problem. I think once it becomes  
7 a reliability problem, then the ISO or the  
8 market operators do have an obligation to do  
9 something about it because you are sort of  
10 creating a reliability threat to a much  
11 broader area than just a local area. And we  
12 have actually stepped in and done something  
13 about it, typically, through transmission  
14 investment.

15 But it is also an economic signal.  
16 And ISOs really are unlimited in terms of what  
17 they should be doing to interfere in the  
18 market economics, which is why you see my  
19 reluctance to sort of have the ISO step out  
20 and create another product somehow that is  
21 addressing the price signal that has been  
22 created in the first instance.

1                   So, ISOs are formed and created.  
2                   The mission is to procure the services  
3                   necessary to ensure reliability. The function  
4                   is not to try to achieve some kind of least-  
5                   cost outcome.

6                   The idea being that the  
7                   interactions of players in the market is going  
8                   to drive the economics. And that is really  
9                   why you sort of see me hesitating at saying  
10                  the ISOs have to step in.

11                  Now it is fine, I think, for  
12                  states who are acting on behalf of their  
13                  consumers to say, "We don't want to live with  
14                  this congestion. We want to order somebody to  
15                  go do something about that" or for consumers  
16                  to take matters into their own hands and say,  
17                  "We don't want to live with this congestion.  
18                  We are going to go and use this as a  
19                  justification to put in a microgrid." All of  
20                  those things happen, and then, obviously, that  
21                  is another action within the market that will  
22                  change the economics of the market.

1                   SECRETARY HOFFMAN: Yes, I respect  
2                   that, and I think there is a better  
3                   understanding that folks need to appreciate  
4                   between markets and the appropriateness of  
5                   congestion at some level. And then, when does  
6                   it really become a problem, that things aren't  
7                   working as effectively, and that somebody  
8                   should step in?

9                   And so, as we look at the  
10                  congestion study or some of the documents that  
11                  will come out of the Department, it is really,  
12                  what is the need? Is it beyond what should be  
13                  normalcy with respect to dealing with normal  
14                  congestion versus something that has gone out  
15                  of whack?

16                  MEMBER VAN WELIE: I think that's  
17                  fine. Governments step in and want to make  
18                  changes to market economics all the time in  
19                  every market. So, to think that you could  
20                  somehow control or prevent that would be  
21                  unrealistic. Government is, then, acting on  
22                  behalf of the consumers affected by that

1 congestion.

2 SECRETARY HOFFMAN: Uh-hum.

3 MEMBER VAN WELIE: So, the  
4 distinction, in my mind, would be it is okay,  
5 I think, for government to do that or for  
6 consumers to take matters in their own hands  
7 or their agents to take those steps. I don't  
8 know if it is okay for the ISO to be doing  
9 that because they are supposed to be neutral  
10 on these issues, to allow the market to  
11 respond.

12 SECRETARY HOFFMAN: Okay.

13 MEMBER MASIELLO: I would like to  
14 add a comment. There is a certain urgency to  
15 this now, because OE and EE already held a  
16 workshop on storage valuation recently. Out  
17 of that will come recommendations for funded  
18 research, I believe.

19 And Sandia and PNNL have recently  
20 drafted the document on similar lines that we  
21 were going to start to circulate to the  
22 Subcommittee and schedule a webinar on. So,

1 if this White Paper is to have any value, we  
2 need to wrap it up.

3 Ed, you have your card up.

4 MEMBER KRAPELS: Yes, I have  
5 really enjoyed the dialog, especially between  
6 Gordon and Ralph, on this paper. It was  
7 instructive.

8 I would like to suggest, Pat, that  
9 the congestion study, in my view, is not one  
10 of the more critical and useful things that  
11 the Department does, because congestion is  
12 just an energy measure. And the electric  
13 system is energy plus capacity, and now FERC  
14 is saying plus public policy at the state  
15 level.

16 So, what drives investment in  
17 energy infrastructure under Order 1000 is  
18 going to become even more rich and more  
19 complex, depending on the state. In my great  
20 State of Massachusetts, you can bet that Order  
21 1000 is going to trigger some public policy  
22 demands for stuff, transmission and

1 microgrids, and who knows what, in pursuit of  
2 the State of Massachusetts' unique  
3 environmental public policy objectives.

4 And again, the federal government  
5 is not there in guiding the states. So, the  
6 states will do what the states will do.

7 SECRETARY HOFFMAN: I didn't mean  
8 to derail the conversation on congestion, and  
9 I will bring it back to storage. It just  
10 happened to be just different things that are  
11 flowing around in our minds in trying to deal  
12 with congestion.

13 But I think, when I went through  
14 the paper, to be honest, it is a very good  
15 paper as it is written. It has a lot of  
16 questions that I think we need to address, a  
17 lot of them on focus, especially at the  
18 consumer side and the consumer level, or at  
19 the distribution level of the role of energy  
20 storage from a community energy storage  
21 perspective, from residential devices, and how  
22 one would value that.

1                   And it goes back to one of the  
2 things that I guess I wanted to ask your  
3 opinion or your thoughts, when you were  
4 pulling the paper, of the multiple value  
5 streams. Because when you look at energy  
6 storage -- and I know this debate has been  
7 going around in the community -- of a  
8 residential-type asset, I'm sorry, the  
9 boundaries are probably going to be pretty  
10 well-drawn, that if it is put on a residential  
11 premise, it is going to be valued to the  
12 customer and you are probably not going to  
13 see, unless there is some sort of market  
14 demand/response program or something where  
15 they can participate, being able to access the  
16 value stream, except depending on how the  
17 market structure allows it.

18                   So, I just wanted your thoughts,  
19 as you guys had that discussion on that.

20                   MEMBER VAN WELIE: I think this is  
21 an evolving topic. And the reason it is an  
22 evolving topic is that, as the complexity of

1 the grid increases and you get the variability  
2 injected into the grid, so the operators are  
3 going to express a need for more responsive  
4 resource on the system. And as that need  
5 grows, so the value stream, I think, grows for  
6 resources that can supply that need.

7 So, in a world where things are  
8 relatively static, the need is quite small.  
9 But we are moving to a world where that is no  
10 longer going to be the case.

11 And so, there is a value stream  
12 today, I think, for storage resources where  
13 they can meet the services as expressed by the  
14 system operators today already, but it is  
15 limited. But I see that growing in the  
16 future. It is just inevitable.

17 If you look at what has happened  
18 in areas where you have high renewable  
19 penetrations, there is already a need for a  
20 much greater degree of flexibility by market  
21 resources. If you couple that with microgrids  
22 and highly-variable demand, I think that is

1 going to ultimately drive the value.

2 And the system operators are going  
3 to have evolve their market designs in order  
4 to more definitively express those needs. And  
5 from that, then, will come the revenue stream.

6 SECRETARY HOFFMAN: So, in stark  
7 contrast, when you get vertically-integrated,  
8 going back to the recommendation of  
9 distribution planning tools, for a vertically-  
10 integrated system they are going to have to  
11 look at a different way to say, how does  
12 storage play in the role of our system and how  
13 do we value anything?

14 MEMBER VAN WELIE: That's right.  
15 I think that is a very different world because  
16 there the vertically-integrated utility has a  
17 responsibility given to them by their state  
18 regulator to come back and do least-cost  
19 integrated resource planning. And they can  
20 sort of look at a completely different sort of  
21 world in terms of, how do they, then,  
22 optimally use storage devices?

1                   So, I think, depending on which  
2 market you are trying to access, there are  
3 going to be different rules, if you want to  
4 call it, in terms of getting the revenue  
5 return.

6                   SECRETARY HOFFMAN: I think it is  
7 just important for a paper and for the  
8 industry as itself to be able to define those  
9 different markets and the rule under which  
10 storage plays, so that we can bring more  
11 clarity to the discussion and advancement with  
12 respect to energy storage. So, I agree.

13                   MEMBER ROBERTS: Well, there is a  
14 lot going on, obviously, thanks to the DOE and  
15 the stimulus programs, and everything else.  
16 Because there's some huge demonstrations that  
17 are starting right now on storage at the edge  
18 of the grid.

19                   And so, I think we are going to  
20 gain a lot of insight because they are  
21 happening all over the country. I am  
22 surprised at how big this thing has become as

1 quickly as it has.

2           So, I think we will gain that  
3 information, staying on the utility side of  
4 the meter for now. Because I think you get  
5 the most benefit with the utility having  
6 control and all the dynamics that can go with  
7 it.

8           There is some testing going on in  
9 the residential side of storage, as a part of  
10 a system, by a couple of utilities. But I  
11 think over the next year, particularly, we  
12 will gain a lot of insight as to how valuable  
13 this is and what its real benefit can be, and  
14 the economics will, hopefully, start to fall  
15 into line, that it has some real benefit.

16           On the other side of the fence,  
17 though, California's new rules, which will  
18 allow storage to be on the customer side with  
19 a fairly hefty rebate, similar to solar, it  
20 will be interesting to see what the responses  
21 are there.

22           MEMBER VAN WELIE: Pat, I should

1 mention there is one area that FERC is looking  
2 at, which is storage as a transmission  
3 investment. So, the properties of storage are  
4 such that it can replace a capacity bank, for  
5 example. And so, in that context, there is an  
6 avenue already there where FERC is sort of  
7 saying, well, how do we deal with this as  
8 perhaps a transmission investment?

9 My previous remark is really look  
10 at storage as an energy resource within the  
11 marketplace.

12 MEMBER REDER: Yes, I do think the  
13 jury is out on this one, and we are learning  
14 as we go. But it is certainly true that a  
15 battery can be applied and the value streams  
16 can go all over the map. But it could be the  
17 same technology, and it could be there for  
18 microgrid. It could be there for distribution  
19 purposes, substation transmission constraint  
20 relief, and even another generation source, to  
21 the extent they aggregate them.

22 I lay that out as kind of a basis

1 because somewhere along the way I think we are  
2 going to have to figure out how to be flexible  
3 in terms of the allocation and thinking about  
4 the benefit streams because it is going to  
5 vary, you know.

6 That community energy storage  
7 device that is hooked up on the low side of a  
8 transformer serving a community is potentially  
9 going to be providing a lot of different value  
10 streams, and potentially it could be there  
11 just for the microgrid application purpose.

12 So, our systems really aren't set  
13 up right now for that kind of dynamic  
14 interpretation of an asset class. I think we  
15 are going to have to change our paradigms and  
16 our thinking and try to figure out how to be  
17 more nibble in cost allocation and benefit  
18 interpretation.

19 MEMBER HEYECK: I agree. It just  
20 triggered, when you said "capacitor bank," a  
21 capacitor bank could be distribution; it could  
22 be transmission; it could be inside the

1 generator plant; it could be on the load side.  
2 So, I would just like to be nibble because we  
3 don't need a micrometer measuring this mud  
4 puddle because, really, we don't want to limit  
5 the application of batteries.

6 And, Gordon, to your point, we  
7 have a battery as a transmission asset in  
8 Texas that the Public Utility Commission of  
9 Texas determined to be a transmission asset,  
10 and the way they deal with the energy is in  
11 the loss side of the equation.

12 CHAIR COWART: Should anybody be  
13 interested, I have written what I think would  
14 be the little intro sentence.

15 (Laughter.)

16 And I think it is non-  
17 controversial. So, I won't take the  
18 Committee's time right now, unless someone  
19 wants me to read it.

20 SECRETARY HOFFMAN: Read it.

21 CHAIR COWART: Okay, I will read  
22 it.

1 (Laughter.)

2 This would be the second paragraph  
3 after "purpose". "This paper focuses on  
4 electricity storage technologies that result  
5 in electricity being delivered back to the  
6 grid. We recognize that many of the benefits  
7 of storage, for example, peak-load reduction,  
8 taking advantage of off-peak, low-emissions  
9 resources, and congestion relief, are also  
10 provided by energy storage systems, such as  
11 thermal systems and the managed charging of  
12 electric vehicles. Those topics will be  
13 addressed by the Committee separately.

14 That's okay? Okay. Okay, we're  
15 done. All right.

16 Any further comments before this  
17 paper is deemed approved?

18 MEMBER NEVIUS: Just one, Ralph.  
19 In the first recommendation about what are the  
20 operational and reliability implications for  
21 grid operators, I wonder if you would be  
22 willing to insert, even parenthetically, a

1 link to some of the published material that  
2 NERC has provided. There is a series of  
3 technical reports on viable resource  
4 integration.

5 CHAIR COWART: All right. Thank  
6 you very much. That was terrific and a very  
7 substantive piece of work.

8 Our next topic is a panel  
9 discussion on interconnection-wide  
10 transmission planning. David Meyer is going  
11 to be leading this off.

12 So, David, can I turn to you?

13 MEMBER ROBERTS: Richard, one  
14 quick point? Did we approve the paper as  
15 noted?

16 CHAIR COWART: Do we need a vote?  
17 I asked whether anybody disagreed. We don't  
18 actually need a formal vote to approve a  
19 generic White Paper. But it can be reported,  
20 I think, that there was very strong support  
21 for the White Paper in the Committee, and if  
22 anyone has an objection, let me know.

1                   So, I am not seeing any. Thank  
2 you very much.

3                   MR. D. MEYER: All right. Well,  
4 we will turn now to our panel on long-term  
5 interconnection level transmission planning.

6                   I am going to provide just some  
7 brief context before we turn things over to  
8 the panelists.

9                   The Recovery Act gave DOE a  
10 significant amount of money to spend and they  
11 explicitly said that this was to go for  
12 interconnection-level transmission planning.  
13 We were very pleased to get this direction,  
14 this assignment, because, as you have already  
15 seen, there are a lot of issues that are  
16 facing the electricity sector, a lot of long-  
17 term changes that need to be understood or  
18 anticipated, to the extent possible.

19                   And so, we wanted to establish  
20 capability, analytic capability, at the  
21 interconnection-level to address some of these  
22 questions. We did not want to replace a lot

1 of the existing planning mechanisms, the  
2 institutional planning activities that are  
3 going on. Rather, we wanted to build on them.

4 But we also wanted to bring  
5 additional people into the process. We wanted  
6 to give states a greater opportunity to  
7 participate, and we wanted to give interested  
8 NGOs a greater opportunity to participate.  
9 And we wanted to have a more fruitful, or  
10 establish the basis, I should say, for a more  
11 fruitful, long-term conversation on  
12 electricity issues, particularly as they  
13 pertain to transmission.

14 So that, by the time a project  
15 comes up for review, we want people to have a  
16 better understanding of, has this project been  
17 analyzed previously by others? What did they  
18 find? How well does this project fit into any  
19 planning frameworks that have been developed,  
20 and so forth?

21 But by involving a lot of these  
22 players early on, we think they will have

1 more confidence in the results when they come  
2 before them in the form of specific proposals  
3 for transmission facilities.

4 So, for the past year and a half,  
5 people in the East, people in the West, and  
6 people in ERCOT have been working diligently  
7 on this assignment. I should say, also, that  
8 in each of these interconnections we  
9 recognized two kinds of entities or two kinds  
10 of activities that we wanted to fund. One was  
11 planning activity by, basically, industry  
12 groups, and we call that the Topic A activity.

13 And then, we wanted to bring state  
14 agencies, state officials, into the process,  
15 but we realized that they would probably need  
16 institutional frameworks of their own. We  
17 wanted the states to be able to discuss some  
18 of these issues on their own, so that they can  
19 get their act together before they go to the  
20 table to talk with the Topic A people.

21 So, Topic A was the industry  
22 group. Topic B was the state group.

1                   So, with that quick introduction,  
2                   I am going to stop. I have asked Brad Nickell  
3                   at WECC to lead this off, and we will have,  
4                   first, a discussion of what the West has been  
5                   doing in this area. Then, we will turn to  
6                   ERCOT, and then we will turn, last, to the  
7                   East.

8                   And I should say that, for the  
9                   Easterners, this was an especially challenging  
10                  assignment because there were no  
11                  interconnection-wide institutions in the East.  
12                  And so, just establishing both an industry  
13                  group representing the full interconnection  
14                  and a state group, both of those were major  
15                  undertakings in their own right, and these  
16                  people really stepped up and were very  
17                  responsive.

18                  So, Brad, are you ready to take us  
19                  on a tour of the West?

20                  MR. NICKELL: I am. Can you hear  
21                  me okay in the room.

22                  MR. D. MEYER: Yes, we can.

1 MR. NICKELL: All right. Great.

2 Well, good morning, everyone.

3 My name is Brad Nickell. I am the  
4 Director of Transmission Planning at the  
5 Western Electricity Coordinating Council.

6 And I apologize I couldn't be  
7 there in person today, but what I would like  
8 to do this morning is provide you a brief  
9 update on the DOE-funded Regional Transmission  
10 Expansion Planning Project here in the Western  
11 Interconnection and the 10-year plan.

12 Special thanks to Assistant  
13 Secretary Hoffman and David for the invite.

14 Go with slide 2, Peggy.

15 In short, what have we been asked  
16 to do by the Department of Energy and by our  
17 planning stakeholders here in the Western  
18 Interconnection? In short, it is really to  
19 expand both the breadth and the depth of our  
20 existing interconnection-wide transmission  
21 planning activities, the WECC.

22 We have worked hard to expand

1 stakeholder participation through two main  
2 ways. One is bringing NGOs in, and not only  
3 opening the door, but reaching out to them  
4 directly and grabbing them by the shirt collar  
5 and pulling them in. In part, how we made  
6 that happen is part of the funding has been  
7 used to fund travel and stipends for non-  
8 governmental organizations.

9           And secondly is create a  
10 constituency stakeholder group, which we call  
11 our Scenario Planning Steering Group, that  
12 brings in all of the diverse interests into  
13 one room.

14           And our other charge is really to  
15 produce credible and publicly-available  
16 information. We have done this in a number of  
17 ways. I am going to talk a little bit about  
18 the 10-year transmission plan that we just  
19 released that you have brochure on in your  
20 packet today, as well as all of the data and  
21 models that went into this effort are all  
22 publicly available and posted in one

1 convenient location on the WECC website.

2 As far as the RTEP program itself,  
3 it is funded in part through the Stimulus Act,  
4 or ARRA. There is a \$14.5 million grant  
5 administered by the Department of Energy to  
6 WECC. In addition to this, there is a  
7 corresponding \$12 million grant to the Western  
8 Governors' Association that covers state  
9 participation as well as a number of WGA-led  
10 activities that are feeding into this.

11 In addition to that funding, we  
12 have a 30 percent cost-share, so, roughly,  
13 \$6.5 million of WECC funds that come from our  
14 traditional statutory funding sources.

15 The next slide, please.

16 This slide shows a little bit of  
17 an organization, they call it an  
18 organizational funding diagram, which  
19 encompasses all of the entities and  
20 organizations in the Western Interconnection  
21 as well as the National Labs that are involved  
22 in this process.

1                   You will see over on the left, as  
2                   David explained, the Topic B to the states and  
3                   their activities, and then Topic A that is  
4                   managed by WECC and under the leadership of  
5                   the WECC Board, TEPPC, or Transmission  
6                   Expansion Planning Policy Committee. And this  
7                   organizational chart really created the  
8                   framework for addressing all of the  
9                   interconnection-wide planning issues here in  
10                  the West.

11                  I think a couple of things to  
12                  note. One is very close coordination between  
13                  WECC and WECC-led activities and the Western  
14                  Governors' Association and the regulators,  
15                  through WIRAB and CREPC, or the Council on  
16                  Regional Electric Power Cooperation.

17                  In short, everybody is involved,  
18                  and we are trying to look at all the issues in  
19                  a consistent manner, and really specifically  
20                  bringing everything in, all of our assumptions  
21                  in, in such a manner that, whether we are  
22                  looking at transmission or we are looking at

1 variable generation integration or reliability  
2 or cost, at the end of each of those  
3 individual analyses we can bring the results  
4 back together and form a package that is  
5 holistic in view.

6 The next slide, please.

7 There are a number of deliverables  
8 under our grant agreement with the Department  
9 of Energy. The 2011 deliverables include  
10 creating this multi-constituency steering  
11 group which is made up of one-third state and  
12 provincial leadership, both from the  
13 regulatory side as well as from the energy  
14 offices and Governors' representatives. The  
15 other part of that constituency group is about  
16 one-third non-governmental organizations and  
17 about one-third traditional utility planning  
18 types, if you will.

19 That group has a very close  
20 interaction and connection with TEPPC.  
21 Basically, one-third of TEPPC and one-third of  
22 the SPSG are the same people. So, we get an

1 inherent coordination there just by people.

2 The 10-year Regional Transmission  
3 Plan, which I will speak to next, in addition,  
4 we are creating a number of long-term capital  
5 planning tools that enable us to bring in  
6 environmental, water, and cultural data into  
7 the transmission planning process. And those  
8 are underway right now.

9 In addition, we have partnered  
10 with a number of universities here in the West  
11 to create educational materials on different  
12 planning topics.

13 In 2013, as we look forward to  
14 that and the end of the grant period, we have  
15 an update and expansion of the 10-year  
16 Regional Transmission Plan, as well as -- and  
17 I apologize; I just realized there is a typo  
18 on there -- a 20-year Regional Transmission  
19 Plan.

20 Next slide, please.

21 There are a number of value  
22 propositions, both nationally and for the

1 Department of Energy, as well as for the  
2 stakeholders here in the Western  
3 Interconnection, which is, from a population  
4 perspective, around 77 million people.

5 One, it is interconnection-wide.  
6 We are looking at it with a consistent lens,  
7 if you will. We have diverse process  
8 leadership.

9 And on that front, I think here in  
10 the West in our processes we have tried really  
11 hard to set the bar for stakeholder  
12 interaction. And I think that is one thing.  
13 If nothing else, we have checked that box.

14 The federal funds that have been  
15 provided by the Department of Energy are very  
16 highly-leveraged, both with financial  
17 contributions from the WECC and our funding  
18 sources as well as millions of dollars of in-  
19 kind contributions from WECC members and other  
20 organizations and stakeholder groups here in  
21 the West.

22 In addition, we are leveraging

1 heavily past DOE-funded activities, including  
2 the Western Governors' Renewable Energy Zone  
3 effort, and I don't know, tens of millions of  
4 dollars of work that has been conducted in the  
5 past and currently at National Labs across the  
6 country, NREL, Sandia, Pacific Northwest  
7 National Lab, and Lawrence Berkeley National  
8 Lab, in particular.

9 In addition, we are leveraging  
10 even data from the Eastern Interconnection.  
11 And special thanks to David Whiteley, who  
12 through their efforts out there got us out of  
13 a pinch related to some capital cost  
14 assumptions. We actually used data from their  
15 effort on understanding the range of capital  
16 costs for transmission, and we used that to  
17 help true-up and validate some of our numbers.

18 In addition, we are leveraging a  
19 number of activities that are university-led  
20 that are, in part, DOE-funded, activities that  
21 the Department is funding under the Power  
22 System Engineering Research Center, or PSERC,

1 as well as CERTS. Those activities and those  
2 people are being leveraged in this effort as  
3 well.

4 Here out West, we have a known  
5 path for perpetual funding of this process,  
6 subject to budget review by the WECC Board  
7 and, of course, approval of our budget by NERC  
8 and FERC. We continue to plan for the  
9 perpetuity of RTEP and this process.

10 With the recent FERC Order 1000  
11 going on the books, it is going to really  
12 shape what RTEP looks like really starting in  
13 2013.

14 The last thing is we are already  
15 seeing that the 10-year Regional Transmission  
16 Plan and the information that was created as  
17 part of that process is used and useful. We  
18 are seeing it in a number of state processes,  
19 both on the regulatory side as well as on the  
20 policy side, and really bringing in this  
21 credible data into a more local jurisdiction,  
22 understanding different opportunities for cost

1 efficiencies here in the Western  
2 Interconnection.

3 In addition, the recent  
4 announcement by President Obama related to the  
5 Grid Modernization Pilot leveraged a number of  
6 activities that were managed under RTEP.  
7 Specifically, this process and WECC  
8 facilitated the creation of what is known as  
9 the Foundational Projects List, which is a  
10 list of transmission projects in the West that  
11 have a high probability of both being needed  
12 as well as being built between now and 2020.

13 This brought many of the lines in  
14 the Western Interconnection to the attention  
15 of the Secretary of Energy, and really led to  
16 the discussion amongst transmission  
17 developers, federal and state agency  
18 leadership, and WECC about the impediments to  
19 transmission development, and specifically,  
20 getting permitting on federal lands.

21 This did result in the creation of  
22 an MOU between DOE and the Federal Land

1 Management Agency that led to the pilot  
2 program that the President announced back a  
3 couple of weeks ago.

4 In addition, WECC and the RTEP  
5 process identified the lines that were  
6 referenced in the pilot project or selected in  
7 the pilot project and the ability, at least in  
8 part, to deliver renewable energy. And I  
9 think that was a key metric to gaining the  
10 Administration's support.

11 Thirdly, we created and  
12 administered a survey on behalf of the  
13 Department of Energy really to ascertain the  
14 permitting status of major lines in the  
15 Western Interconnection. And it is the  
16 answers to this survey that also drove, in  
17 part, the selection of the lines that were  
18 announced by President Obama.

19 And lastly, and I think long-term,  
20 this is the single biggest value proposition  
21 of RTEP in general. We have had the  
22 opportunity to educate many non-traditional

1 planning stakeholders on the importance of  
2 getting transmission built and how this does  
3 connect into lowering the environmental  
4 footprint overall of producing electricity.

5 Next slide, please.

6 The last main thing I am going to  
7 cover is a little bit about the 10-year  
8 Regional Transmission Plan. You do have a  
9 brochure in your packet, I believe, that  
10 provides an Executive Summary.

11 And in that brochure are a few  
12 things and a couple of key messages. One is  
13 this plan is a regional interconnection-wide  
14 perspective and covers really three things.  
15 We are looking at grid utilization, we are  
16 looking at cost, and we are looking at  
17 environmental impact, all through the lens of  
18 assuring reliability in the future.

19 By doing this, we have organized  
20 stuff, we have organized a plan in three ways.  
21 One is we have taken a look at an expected  
22 future network, and this is really based on a

1 number of bottoms-up planning assumptions from  
2 state, provincial, local, as well as some  
3 regional planning groups' planning activities.  
4 We also looked at a number of alternatives to  
5 this expected future from really the lens of  
6 cost and grid utilization, and then, a number  
7 of other insights specifically related to  
8 environmental and water aspects as well as  
9 variable generation integration.

10 The plan is very stakeholder-  
11 driven stem to stern, from the assumptions to  
12 the studies that were conducted, to the review  
13 of the results in the creation of the plan  
14 documentation.

15 Importantly, this is a first-time  
16 product for WECC, and we look forward to  
17 building on it in the next two years and as we  
18 put out another set of plans.

19 From a documentation perspective,  
20 and this is all available at that address on  
21 the WECC website, we have Executive Summary  
22 brochure. In addition, we have roughly a

1 hundred-page plan summary that electronically  
2 is available now that is being printed as we  
3 speak. If you are interested in a copy of  
4 that, you can go to our plan website and there  
5 is a place where you can request that, and we  
6 will send you out how many copies you would  
7 like.

8 In addition, there's over 600  
9 pages of very detailed analytic details, as  
10 well as spreadsheets and all kinds of data and  
11 modeling information that can be used  
12 everywhere from the Federal Energy Regulatory  
13 Commission and DOE all the way down to local  
14 planning jurisdictions.

15 The next slide, please. This is  
16 slide 7.

17 We had a number of observations  
18 and recommendations. The big one that is  
19 getting a lot of attention right now is we  
20 looked at a number of alternative packages,  
21 resource packages related to meeting enacted  
22 state renewable portfolio standards. And we

1 found some alternatives that look an awful lot  
2 less expensive than some of our assumptions  
3 that were provided by our stakeholders. That  
4 has set off some interesting discussions  
5 between a number of different states. In  
6 part, California is two-thirds of the  
7 incremental renewable energy demand between  
8 now and 2020, and so they are the biggest  
9 market, if you will. And there are places  
10 other than California that would like to sell  
11 into that market. It looks like there may be  
12 some cost advantages in doing that, in  
13 building the transmission necessary to deliver  
14 that remote renewable resources.

15 In addition, we have some more  
16 reliability and congestion-based observations,  
17 as well as some issues related to available  
18 generation, cooperation on planning.

19 And six and seven are both  
20 something new. One is we did a pilot on  
21 environmental and cultural considerations.

22 And what we really had an eye is, how can we

1 incorporate those very important aspects into  
2 future interconnection-wide transmission  
3 planning processes? And we are looking  
4 forward to doing that.

5 In addition, in partnership with  
6 the Western Governors' Association and Sandia  
7 National Lab, we have looked at the water  
8 resource impacts on future generation mixes.  
9 We did that as a pilot this time and Sandia  
10 built the models in order for us to look at  
11 that. We are going to be bringing that into  
12 the decisional process going forward. In  
13 addition, a number of enhancements going  
14 forward for our transmission planning  
15 activities.

16 Next slide, please.

17 What to expect next? We have a  
18 number of enhancements that I have listed  
19 there to our planning process and really  
20 looking out further and being more scenario-  
21 driven in our planning, and looking at all of  
22 the what if's, and trying to understand how we

1 get to where we might want to go.

2 In addition, our educational  
3 materials and modules that are being produced  
4 by Arizona State, Washington State, and  
5 Colorado State, we have three of fifteen  
6 modules done. Those will be posted or will  
7 start being posted to our website and be  
8 publicly available to all here shortly. And  
9 then, we have our next set of plans in 2013.

10 Next slide.

11 Peggy Walsh and David on our  
12 preparation call last week asked me to provide  
13 some comments and things for your  
14 consideration at EAC. And so, I have things  
15 I would like to put in front of you.

16 One is leverage the activities  
17 that you have paid for through RTEP and the  
18 grant to WECC. We think the information in  
19 there is very useful for you to meet your  
20 obligations under EAct '05 and the triennial  
21 congestion studies. So, we encourage you to  
22 leverage your work for that.

1                   Continue to support WECC-led  
2 analyses an our processes. In part, leverage  
3 our robust stakeholder process to support your  
4 guys' mission and objectives at the national  
5 level.

6                   Continue to support the  
7 Department's participation in WECC activities.  
8 David's and Larry's direct participation, as  
9 well as others from the land management  
10 organizations or agencies and FERC have  
11 provided significant contributions to the  
12 process and the plan that you have in front of  
13 you.

14                   Help WECC continue to leverage  
15 other DOE-funded activities, and specifically,  
16 promote to the Department other related DOE-  
17 funded activities that can be applied to  
18 planning activities nationwide and at  
19 different levels. And really create packages  
20 of information that are used and useful.

21                   There are lots of things that have  
22 been done over the last two or three years at

1 the National Labs and other activities that we  
2 have been able to leverage. And we really  
3 encourage the EAC to advise DOE to keep  
4 looking at things holistically, and how can  
5 one activity help or be leveraged by other  
6 activities.

7 And lastly on that level is the  
8 continued support of PSERC, or the Power  
9 System Engineering Research Center. We have  
10 been able to leverage a lot of good work from  
11 there as well as CERTS.

12 With that, that concludes my  
13 remarks, David.

14 CHAIR COWART: Well, thank you,  
15 Brad. That was excellent.

16 I want to move on fairly quickly  
17 to the presentations from the other  
18 interconnections, but, first, I want to see if  
19 people have any clarifying questions they want  
20 to raise while we have Brad immediately  
21 available here.

22 We have one from David Nevius.

1 MEMBER NEVIUS: Hi, Brad. Dave  
2 Nevius.

3 I know there are a lot of federal  
4 lands in the West. Are you doing anything as  
5 part of this study to look at what it would  
6 take to get siting approvals for some of these  
7 facilities?

8 MR. NICKELL: Dave, as you know,  
9 WECC isn't in the siting and permitting  
10 business.

11 MEMBER NEVIUS: Brad, you're  
12 breaking up. Can you start over?

13 MR. NICKELL: Oh, yes. Can you  
14 hear me better now?

15 CHAIR COWART: Yes, when we put  
16 you on mute, we can hear you. When we put us  
17 on mute, we can hear you.

18 (Laughter.)

19 MR. NICKELL: Excellent.

20 WECC is not in the business of  
21 siting or permitting at all. We do help  
22 facilitate conversations, though. I think the

1 DOE pilot and the MOU that I described earlier  
2 is one way, just calling attention to the need  
3 and usefulness of transmission projects.

4 That, in my mind, is the WECC angle on that.

5 And the other thing I will add to  
6 that is, as part of the Topic B funding to the  
7 Western Governors' Association, they are  
8 looking into state and federal cooperation on  
9 moving needed transmission projects  
10 expeditiously through their respective  
11 permitting processes at the state and federal  
12 level.

13 CHAIR COWART: Brad, we have a  
14 clarifying question from Mike Weedall also.

15 MEMBER WEEDALL: Brad, Mike  
16 Weedall, Bonneville Power.

17 I was wondering, could you tell me  
18 what you guys are doing or how you are  
19 incorporating the planning process?  
20 Certainly, what we are trying to do at  
21 Bonneville in our planning on non-construction  
22 alternatives or non-wire solutions.

1 MR. NICKELL: That is a point I  
2 probably didn't emphasize enough. As part of  
3 both our expected future as well as our  
4 alternatives, we look at a number of energy-  
5 efficiency and demand-type management  
6 programs, both what we think is representative  
7 of existing statutory levels, if you will, as  
8 well as with a lot of help from Lawrence  
9 Berkeley National Lab, again DOE-funded,  
10 looking at what is the full economic potential  
11 of energy efficiency and demand-type  
12 management, and how does that impact the need  
13 for energy and for transmission? So, we took  
14 a hard look at that, and there are some  
15 observations in the plan that are centered on  
16 that particular topic.

17 CHAIR COWART: We have time for  
18 one more. Brad Roberts?

19 MEMBER ROBERTS: This is Brad  
20 Roberts from the Electricity Storage  
21 Association.

22 Are you looking at energy storage

1 as well in that?

2 MR. NICKELL: In this round, we  
3 did look at some energy storage. In  
4 particular, we have some pump hydro projects  
5 that we did some modeling on, as well as we  
6 took a first shot at modeling some compressed  
7 air energy storage.

8 From our perspective, what we are  
9 really looking at is large-grid storage where  
10 we can get sufficient amounts of energy and  
11 capacity. So, that's our focus versus the  
12 distributed side of more, if you will,  
13 battery-scale focus.

14 That is an area that was  
15 identified in our plan as a need area to focus  
16 some more analytical activity. And one of the  
17 challenges that we have had is creating models  
18 that really represent actual storage  
19 operations well and get the pricing right in  
20 our models.

21 But we are working with some  
22 developers as well as the National Renewable

1 Energy Lab has built some models recently that  
2 will allow us to represent that better. So,  
3 we are looking forward to that in our current  
4 planning cycle. That information will be  
5 available in our next set of plans in 2013.

6 MR. D. MEYER: Great, Brad. Thank  
7 you again for that excellent presentation.

8 We are going to turn next to  
9 ERCOT. Warren Lasher, who has been leading  
10 the planning work there, is going to tell us  
11 about what they have been doing.

12 MR. LASHER: Great. Thank you,  
13 David, and thank you for the opportunity to be  
14 here today and speak before you.

15 I have got a presentation here. I  
16 wanted to give a little bit of background  
17 information to kind of lead into where we  
18 started our process associated with the ARRA  
19 funding.

20 But, first, I have to find out how  
21 to work this device here. Ah, good.

22 So, a little background

1 information on ERCOT. Most of this will be  
2 familiar to many of you.

3 As you can see, ERCOT is the  
4 smallest of the three interconnections. We  
5 have about a peak load of 68,000 we recorded  
6 this year. We have very limited tie capacity  
7 with the outside regions. We have got about  
8 1100 megawatts tie capacity; 800 of that is  
9 with the Eastern Interconnect. The remainder  
10 is with Mexico. We have about 2800 megawatts  
11 of generation that can switch between ERCOT  
12 and the Eastern Interconnect.

13 Just a little background on what  
14 our generation resources are, we are a  
15 predominantly natural gas-fired resource.  
16 Natural gas sets the marginal cost of power in  
17 most hours.

18 We have a significant amount of  
19 wind energy already on the system. We  
20 recently moved to an LMP day-ahead and real-  
21 time market. Generation is redispatched on a  
22 five-minute basis. And importantly, we have

1 an energy-only market for wholesale  
2 generation.

3 This is our transmission system.  
4 In ERCOT, 345 kV is our highest voltage level  
5 at this time. The red lines there are 345 kV.  
6 The blue lines are 138 kV. That is just to  
7 give you an idea of kind of the scope. We  
8 have San Antonio, Houston, Dallas are large  
9 load centers.

10 So, one of the important points is  
11 that we already have a fairly vibrant  
12 interconnection-wide planning process in  
13 ERCOT. We have a five-year planning process.  
14 We have participation by specific transmission  
15 owners. We have a fairly vibrant market for  
16 participation in building new transmission.

17 We also have an established  
18 process for a long-term transmission plan, a  
19 10-year plan that has been developed three  
20 times. It is required by State law to be done  
21 every even-numbered year.

22 We have a legislature that comes

1 into session every odd-numbered year. It only  
2 meets in odd-numbered years for approximately  
3 140 days, I think is the legal limit. So,  
4 that is a little Texas joke for you there.  
5 But the purpose of the long-range plan is to  
6 provide them with a 10-year view of the system  
7 when they come into session.

8 We also have recently established  
9 a significant investment in new transmission  
10 for renewable energy projects. So, what you  
11 are seeing there is the CREZ plan. It started  
12 as a legislative discussion back in 2005. The  
13 entire plan, approximately 2300 miles of new  
14 right-of-way, is scheduled to be completed by  
15 the end of 2013.

16 We currently have approximately  
17 10,000 megawatts of wind on the system. That  
18 plan is established to provide sufficient  
19 transmission capacity for up to 18,000  
20 megawatts of wind capacity.

21 As a highlight there also, we have  
22 33,000 megawatts of wind and also almost 1500

1 megawatts of solar projects that are currently  
2 in the interconnection queue being evaluated.

3           So, in that context, back in April  
4 2010, we received ARRA funding from the  
5 Department of Energy to support our long-range  
6 planning process. And the goal of the funding  
7 has been to enhance the existing long-range  
8 planning process in two ways.

9           First of all, to allow ERCOT and  
10 stakeholders to develop and vet new tools  
11 which will provide additional and analytical  
12 capability for the long-range planning process  
13 and, also, to establish new stakeholder forums  
14 for evaluating the long-term needs of the  
15 system and evaluating the long-term planning  
16 process in general.

17           And one of the other components of  
18 this process has been to expand the future  
19 view of the ERCOT system from a 10-year plan  
20 to a 20-year plan.

21           Where we stand today, we have  
22 worked with stakeholders to develop and vet a

1 set of base tools to allow for analysis of  
2 resource expansion, likely resource expansion  
3 in our energy-only market through a 20-year  
4 planning horizon. We have established a  
5 business-as-usual scenario in order to vet  
6 those tools, and we have had detailed, lengthy  
7 discussions regarding the set of scenarios  
8 that will comprise this initial long-term  
9 planning analysis.

10 We have an interim report which  
11 has been finalized and is available on the  
12 [ercot.com](http://ercot.com) website.

13 This is a timeline of where we  
14 have been and where we are going. The next  
15 six months for us is going to be a period of  
16 incorporating some new technologies, and I  
17 think I have got some more information on that  
18 on the next slide, and, also, finalizing our  
19 set of future scenarios, so that we can  
20 develop a fairly robust view of potential  
21 futures for the ERCOT system.

22 So, these are some of the new

1 technologies that we are working to  
2 incorporate into our long-range planning  
3 analysis: demand-side resources, solar  
4 resources, storage, geothermal, electric  
5 vehicles, et cetera.

6 We are working with stakeholders  
7 who have specific technical knowledge in these  
8 areas; plus, we are reaching out to National  
9 Labs, et cetera, to develop a set of potential  
10 assumptions associated with these resources,  
11 so that they can then be incorporated into  
12 kind of our base tools that we have developed.

13 So, in summary, the ARRA funding  
14 has been utilized to enhance what was an  
15 established long-range planning process, both  
16 to enhance the actual tools and the processes  
17 in order to conduct those studies, but also to  
18 enhance the stakeholder involvement in those  
19 studies.

20 In the future, the plan is to  
21 utilize those tools to conduct the planning  
22 that is already required by State law.

1                   And I believe that is my last  
2                   slide.

3                   MR. D. MEYER: Any clarifying  
4                   questions for Warren? Yes?

5                   MEMBER KRAPELS: How did ERCOT or  
6                   the Texas Commission decide who would build  
7                   the various transmission lines that were aimed  
8                   at wind integration?

9                   MR. LASHER: Good question. There  
10                  was a regulatory rulemaking process, and the  
11                  plan itself was first established and the  
12                  lines were certified as lines for the  
13                  Competitive Renewable Energy Zones. And then,  
14                  we went into a rulemaking process where  
15                  various transmission companies actually bid on  
16                  the right to build those transmission lines.

17                  There was a very robust  
18                  interaction between the transmission  
19                  companies. We actually had, I believe, four  
20                  companies come in who had never built  
21                  transmission in Texas before who were awarded  
22                  a portion of the CREZ plan.

1           The CREZ plan is being built by, I  
2 believe, eight or nine different transmission  
3 companies. And it has been a really  
4 interesting process.

5           One of the other aspects of this  
6 has been there has been some extremely  
7 detailed technical studies that have been  
8 conducted associated with reactive power needs  
9 associated with that plan, and those studies  
10 have been coordinated by all of those  
11 transmission companies. So, it has been very  
12 interesting, the dynamics of some of those  
13 very detailed technical studies with some of  
14 the new entrants and the established parties  
15 working together to ensure the reliability of  
16 the system.

17           CHAIR COWART: You mentioned in  
18 passing 2300 miles of new transmission as a  
19 result of this planning process.

20           MR. LASHER: That was a result of  
21 the planning process for the Competitive  
22 Renewable Energy Zones.

1                   CHAIR COWART:  And we commonly  
2                   hear that it is impossible to build new  
3                   transmission and site new transmission, get it  
4                   done.

5                   MR. LASHER:  Uh-hum.

6                   CHAIR COWART:  Is there something  
7                   you want to tell us about Texas that we ought  
8                   to know?

9                   (Laughter.)

10                  MR. LASHER:  Well, you know, it is  
11                  interesting because it is becoming  
12                  increasingly difficult in Texas to build new  
13                  transmission, and it is extremely difficult to  
14                  build new transmission once you get into some  
15                  of the urban centers.

16                  This process grew out of a  
17                  legislative mandate.  So, this was originally  
18                  vetted at the Texas Legislature.  And from  
19                  then on, it was given very high priority.

20                  The projects themselves were  
21                  required to be fast-tracked through the  
22                  regulatory routing process.  So, they each

1 went through the routing analysis process at  
2 the Commission on a six-month deadline. After  
3 six months, by Texas law, once a project is  
4 fast-tracked, is determined to be fast-  
5 tracked, either for a reliability need or in  
6 this case the Texas Legislature determined  
7 that, it is given 180 days to go through the  
8 routing process.

9 If on the 181st day it is not  
10 approved by the Commission, a route is not  
11 approved, then it is approved by law. So,  
12 there is a good bit of push behind it.

13 But, you know, a lot of these  
14 lines went through regions of Texas where  
15 there is not a lot of population. Some of the  
16 lines went for 20-30 miles over one person's  
17 land, which we have 500-, 600-, 700-thousand-  
18 acre ranches out in west Texas. However, I  
19 think it grew out of a belief in the overall  
20 need for and desire for increased renewable  
21 energy for Texas.

22 MR. D. MEYER: I recognize we have

1 four cards up, and Bob Curry just signaled his  
2 desire to offer some comments. I am going to  
3 ask people to withhold their comments for now  
4 because I think we do need to move on to our  
5 third presentation and then go into a full  
6 discussion.

7 MEMBER CURRY: David, could I just  
8 add that I have spoken with each of the three  
9 Texas Commissioners about the process of  
10 people coming in who have these large ranches  
11 and pleading their case to move it 15 feet  
12 that way, 400 feet the other way. And  
13 apparently, each of the Commissioners split up  
14 the number of disgruntled potential customers  
15 and met with them one-on-one.

16 Is that a fair statement, Warren?

17 MR. LASHER: There was a lot of  
18 work conducted. However, I should say that  
19 some of those transmission lines had over a  
20 thousand interveners. So, there were some  
21 that had a significant number of small  
22 landowners and then some that had just a few

1 very large landowners. Yes, there was a lot  
2 of work that went to that.

3 MR. D. MEYER: Our third  
4 presentation will be from David Whiteley. And  
5 I go back to the earlier remark that in the  
6 East it was necessary to create new  
7 institutions to carry out this assignment.  
8 So, this led to the formation of a group  
9 called the Eastern Interconnection Planning  
10 Collaborative, and David Whiteley is leading  
11 the project on behalf of that group.

12 So, David?

13 MR. WHITELEY: Great. Thank you,  
14 David.

15 Just a little bit of background on  
16 the EIPC first, and sort of a process update  
17 and structure where we are at, so you are a  
18 little more familiar with the EIPC. Then, I  
19 want to talk about our study results so far  
20 and some of the value that has been unlocked  
21 in the work that we have done, and then, of  
22 course, sort of what's next.

1                   So, taking a little step backward,  
2                   the EIPC was formed as a self-funded  
3                   organization by planning authorities in the  
4                   East. I guess now the term is Planning  
5                   Coordinators, but back when it was formed, it  
6                   was planning authorities, really on the basis  
7                   with the intention of integrating and  
8                   analyzing the approved regional plans in the  
9                   East, and to develop potential expansion  
10                  scenarios and do transmission expansion  
11                  analyses on those expansion scenarios, all of  
12                  this in a manner consistent with Orders 890  
13                  and now Order 1000.

14                  As the DOE was funding the  
15                  interconnection studies, EIPC applied and was  
16                  awarded a \$16 million grant for studies in the  
17                  East. And this grant is being conducted in  
18                  two phases that I will describe.

19                  So, who are the 26 planning  
20                  authorities? I have listed them here as well  
21                  as highlighted the principal investigators on  
22                  the DOE project, the DOE-funded

1 interconnection studies project.

2 In fact, in the room here, three  
3 of my 26 bosses are represented. So, if I say  
4 something wrong, please correct me.

5 I mentioned that the DOE project  
6 is being conducted in two phases. This is  
7 really a transmission analysis or a  
8 transmission study. But to do transmission  
9 planning analyses or transmission studies, you  
10 have got to start with the resources.

11 And so, our study is really in two  
12 parts. As David mentioned, since we didn't  
13 have sort of a structure, one of the first  
14 things was to create that open and inclusive  
15 stakeholder structure and process to  
16 participate in the study.

17 Then, leveraging on what the EIPC  
18 was really formed to do, complete an  
19 integration of the existing regional plans,  
20 and we chose the year 2020, which is a 10-year  
21 out case, essentially, because it is as far  
22 out in the future as the Regional Planning

1 Authorities had information at the time.

2 And then, the first real  
3 substantive work for the future is to look at  
4 resources and resource options based on an  
5 economic basis beyond 2020. So, while the  
6 case that we could originally create was a  
7 2020 case, we wanted to extend that by looking  
8 at potential resources and resource futures  
9 based on what the economics might show, maybe  
10 2030, 2040, 2050 even, into the future.

11 Then, the real transmission  
12 analysis is in Phase 2, and that work hasn't  
13 even started yet. So, I will give you a  
14 little bit of a view on that.

15 In terms of where we are at, the  
16 stakeholder process has been established and  
17 is functioning, I would say, in a very robust  
18 manner. We have got 29 Steering Committee  
19 members. We have a stakeholder Steering  
20 Committee, representatives from all sectors  
21 and the states. In fact, one of our Steering  
22 Committee members is here today as well.

1 Sonny is on our Steering Committee.

2 It operates on a consensus-based  
3 manner. We don't take votes, although we have  
4 threatened to try to take votes.

5 The dialog has been very active  
6 and intense. It is, I think, from time to  
7 time based on individual positions and  
8 individual opinions, but collectively I think  
9 we are coming to some very interesting answers  
10 and results.

11 We have got a great interface with  
12 the states and the state group that has been  
13 formed in the East and is funded to  
14 participate in these studies as well as do  
15 some other White Papers and other studies.  
16 That is the EISPC group, the E-I-S-P-C,  
17 Eastern Interconnection States Planning  
18 Council. We have got a good working  
19 relationship with them.

20 And where we are at with Phase 1,  
21 which will draw to a close at the end of this  
22 year, we have completed that integrated load-

1 flow case for the year 2020. We have  
2 developed resource futures for the year 2030  
3 and completed at this point 77 of 80 economic  
4 analyses of how the future resources might  
5 develop.

6 And the stakeholders are now in  
7 the final stages of choosing three scenarios  
8 that will be analyzed from a transmission  
9 standpoint next year. Again, this is really  
10 a transmission study, but it starts with  
11 resources.

12 So, let's look at some of those  
13 study results. And I don't want to bore you  
14 with 77 out of 80 results, but I do want to  
15 highlight, beyond the integrated regional  
16 planning case for 2020, we have got these  
17 eight future resource expansions. And they  
18 are really policy-driven with various  
19 sensitivities on the input assumptions.

20 And again, it is economic-driven.  
21 So, the policies are around things like  
22 carbon, RPS, energy efficiency, nuclear, those

1 kinds of different policy options that you  
2 could sort of put your finger on and impact  
3 how the resources may develop from, again, an  
4 overall macroeconomic kind of view.

5 And then, there will be the three  
6 scenarios that are eventually chosen for the  
7 transmission analysis. And that is what our  
8 Phase 1 is about.

9 The eight futures that were  
10 ultimately chosen by stakeholders include a  
11 business-as-usual, which is really a no-  
12 further-policy-option future. Everything that  
13 is in place right now stays in place. So,  
14 states with RPS requirements, existing EPA  
15 regs, anything that is there today stays in  
16 place, but nothing new.

17 And then, various policy options,  
18 a couple based on a carbon-constrained future.  
19 And that is implemented by putting a price on  
20 carbon. So, if you emit carbon, it costs. It  
21 costs to create carbon, both from a national  
22 implementation standpoint or a regional

1 implementation standpoint, where you are  
2 looking at regional constructs of how the  
3 carbon constraint is met.

4 Then, too, on an RPS, where there  
5 is a 30 percent renewable portfolio standard,  
6 and again, implemented nationally or  
7 regionally, where the regions are constrained  
8 to meet that requirement within the region.

9 A case that is a very aggressive  
10 energy-efficiency demand-response, distributed  
11 generation and Smart Grid, we haven't come up  
12 with a good acronym for that one because it  
13 would be really long. But let's just call it  
14 the Energy Efficiency Demand-Response Case  
15 with that other stuff, too. And that was a  
16 very interesting future with tremendously-  
17 reduced demands.

18 Then, there was a nuclear  
19 resurgence future that was proposed and has  
20 been studied, and their nuclear generation and  
21 development was given some advantages costwise  
22 that would say, gee, if nuclear cheaper, what

1 would it look like in the future? Would we  
2 end up with more nuclear? So, we sort of  
3 pushed that button to see what would happen.

4 Well, the quick question here from  
5 my right was, where would you put the nuclear?  
6 And there were only a couple of places where  
7 it was prohibited in the model, and one was in  
8 Manhattan. We decided we wouldn't build a  
9 nuclear plant in Manhattan, in the New York  
10 zone; JK I guess it is.

11 (Laughter.)

12 And then, I think Wisconsin was  
13 the only other place where it was prohibited.

14 And then, we had the final future  
15 was what I call the kitchen sink, which is the  
16 Combined Federal Climate and Energy Policy,  
17 which is a carbon constraint, an RPS  
18 requirement, and energy efficiency and demand  
19 response, all thrown in together, to see if  
20 you put all the policies together, how  
21 different is it from any of them individually?  
22 So, a very interesting way of structuring how

1 the future resources might development.

2 Let me just give you a quick view.

3 Future 2, which was the national  
4 implementation of a carbon constraint, and  
5 here the objective was to get 80 percent of  
6 the carbon out of the economy by 2050. We did  
7 that by basically charging for carbon  
8 emissions in the entire economy.

9 And what we found, by 2030, is  
10 that, if you can see the yellow numbers at the  
11 bottom, basically, by 2030 the electric sector  
12 of the economy almost totally decarbonizes.  
13 You have 250 gigawatts of coal retirements,  
14 300 gigawatts of wind development, and about  
15 120 gigawatts of combined cycle, but the  
16 combined cycle only runs a small amount of  
17 time. Of course, you have got nuclear and  
18 hydro as still represented.

19 But by 2030, the electric sector  
20 is a very low carbon-emitter because it is the  
21 easiest in terms of carbon price for the  
22 economy, transportation being the one that is

1 more difficult to achieve.

2           So, those are the kinds of  
3 results, and we have 77 of these tables that  
4 are 77 different snapshots of what the future  
5 resources might look like.

6           We also did at this point some  
7 high-level transmission analysis. And this is  
8 the work that Brad was talking about earlier  
9 that we shared with the West. In terms of  
10 looking, the resources is just one, of course,  
11 part of the equation. How those resources  
12 drive transmission will really be uncovered in  
13 Phase 2, but at least to give some feel for  
14 the impact in the first phase of the project,  
15 we did some high-level estimates of the amount  
16 of transmission that would need to be added.

17           And we did that through a  
18 building-block approach, basically, taking  
19 transmission lines and looking at them as if  
20 they are single blocks. If you need a  
21 thousand megawatts of transfer, you use a 765,  
22 or excuse me, a 500 kV line. If you need

1 2,000 megawatts worth of transfer, you use the  
2 765 kV line, and just put them in in blocks to  
3 try to come up with a real coarse estimate of  
4 what would be required.

5 And for the five futures where  
6 there was a significant amount of transmission  
7 added, future 2 being this carbon-constrained,  
8 future 5 being an RPS, and 8 being the kitchen  
9 sink, where you have got everything, a  
10 significant amount of transmission miles being  
11 added and cost anywhere from \$30 to about \$60  
12 billion.

13 But, again, this is a real broad-  
14 brush, high-level kind of estimate, simply to  
15 give an indicator, not to be a definitive data  
16 point that is used in any kind of a decision  
17 manner.

18 So, that is kind of where we are  
19 at on Phase I, but I think we have already  
20 unlocked some value. And let me just touch on  
21 a few of those things.

22 First, the stakeholder process

1       itself, creating it in the East, where there  
2       hasn't been an interconnection-wide kind of  
3       analysis, I think is an important place where  
4       we have achieved some value with a very  
5       balanced representation, I think, from the  
6       stakeholder community.

7               The states process that was  
8       created through the EISPC has been actually  
9       very helpful in this study process, and we  
10      have got a good relationship, as I said, with  
11      the states.

12             The inter-regional coordination  
13      and discussion that is taking place within the  
14      planning authority community I think is very  
15      helpful because it is bringing all of the  
16      planning authorities together to look at this  
17      study sort of one at a time or together as one  
18      big study.

19             And that was probably most  
20      highlighted by the development of this inter-  
21      regional case for 2020. And there was very  
22      good dialog of what the stakeholders believed

1 would happen in 2020 versus what the planning  
2 authorities believed would happen in 2020.

3 And it is not about being right or wrong here,  
4 but just the dialog was, I think, very  
5 valuable.

6           Clearly, there has been an  
7 educational process, both in terms of the  
8 folks that are at the table in the study, but  
9 also in understanding the tools and the  
10 language and the study results themselves.  
11 And discussion on how to create a 20-year-out  
12 case has been very valuable. Again, planning  
13 authorities right now look about 10 years into  
14 the future while we are looking 20 years into  
15 the future, and how we go about creating that  
16 case has been very helpful.

17           Certainly, not without challenge.  
18 Clearly, we are trying to integrate resource  
19 analysis and transmission analysis. Taken to  
20 the extreme, this would be an integrated  
21 resource plan for the Eastern Interconnection,  
22 which is not achievable. We have known that,

1 but I think it has been underappreciated.

2 And also, realizing that you  
3 cannot model everything at the same time. We  
4 can't model the gas system and the electric  
5 system and all the environmental regulations,  
6 "and, and, and", and put it all together and  
7 have one great big model analyze everything.  
8 You have got to break it down into pieces.

9 Understanding how the changes to  
10 the inputs change the results, at least from  
11 a resource standpoint, it has been kind of  
12 interesting because you push on the system in  
13 one spot by an assumption, maybe it is natural  
14 gas price or something else, and there are  
15 consequences that have been uncovered that we  
16 wouldn't have anticipated.

17 And then, of course, accommodating  
18 the diverse input from the diverse stakeholder  
19 community has always been a challenge. I have  
20 been accused of being the chief squirrel  
21 herder, not cat herder but squirrel herder,  
22 because of the diverse interests here.

1                   And then, finally, translating the  
2                   technical answers into something that people  
3                   can understand and statements that people can  
4                   see as valuable. Where are we getting value  
5                   out of these studies? And that is a challenge  
6                   for us as well.

7                   So, what's next? We have Phase  
8                   II, which will be conducted in 2012. That  
9                   will be the for-real transmission work. That  
10                  is exciting for me as a transmission planner.

11                  And the three scenarios that the  
12                  stakeholders are choosing will be analyzed in  
13                  the year 2030. We are going to focus probably  
14                  at the 230 kV level and above, again, because  
15                  of the size of the interconnection.

16                  We will be doing production cost  
17                  work and cost estimation work for generation  
18                  and transmission expansions. These will be  
19                  more detailed answers than the ones that we  
20                  created for Phase I. That is the work in  
21                  front of us in 2012.

22                  And the three scenarios, just if

1 you are interested, I think where we are going  
2 to end up, we are going to have a business-as-  
3 usual and then we are going to have a  
4 regionally-implemented, nationally-set RPS.  
5 So, this 30 percent renewable portfolio  
6 standard, but regionally-implemented, will be  
7 a scenario.

8           And then, finally, it is the  
9 kitchen sink scenario. The national carbon  
10 with increased energy efficiency, demand  
11 response. And very interestingly, you could  
12 put the RPS in there and you would get that as  
13 a bonus, because if you push on carbon, you  
14 also take care of a renewable portfolio  
15 standard to get that as a benefit. Sort of it  
16 just comes along for the ride, because if you  
17 are going to reduce carbon, the only way to do  
18 it is through renewables.

19           One final thing, just our cheap  
20 plug for our website. If you don't know where  
21 it is, we are [eipconline.com](http://eipconline.com)

22           And I look forward to your

1 questions.

2 MR. D. MEYER: Thank you, David.

3 That was very informative, I thought.

4 Well, let's go back to the  
5 questions. Mike, I think you had your card up  
6 first.

7 MEMBER HEYECK: I couldn't resist  
8 Rich's question. The answer on why things  
9 work so well in Texas: AEP does have a big  
10 footprint in Texas. We are the second CREZ  
11 provider. It is very simple: one planner,  
12 one siting authority, and one regulator.  
13 That's why it works.

14 MR. D. MEYER: Rick Bowen.

15 MEMBER BOWEN: Yes, I guess it is  
16 kind of a question. I think David answered  
17 part of my question for his section. But for  
18 ERCOT, I know recently the air regulations  
19 have been kind of getting a lot of highlight,  
20 and it is impacting a lot of the generation  
21 side of the equation, which I would assume --  
22 I know in David's because we have been part of

1 that group, his group anyway -- have had some  
2 modeling around it. But I think, even in  
3 David's, we have tended to focus a little more  
4 on the carbon aspects as opposed to overall  
5 MAC changes and things that go beyond just the  
6 carbon simulations of what happens if carbon  
7 plays a role in the U.S. economy.

8 And so, I guess I wasn't sure,  
9 though, in ERCOT what we're doing down there  
10 -- and I say "we're" because I live in Houston  
11 -- but what we are doing down there relative  
12 to modeling that in, the study work that you  
13 guys did.

14 Did you take into account MAC  
15 impacts on the solid fuel plants and what may  
16 or may not happen, if, indeed, they are drug  
17 into that, which I assume they would be? And  
18 of course, CSAPR kind of hit us all by  
19 surprise, but I wasn't sure if that was in  
20 there, either.

21 MR. LASHER: Yes, the specific  
22 regulations that you mention haven't been

1 incorporated into the actual scenarios that  
2 are being developed for our studies. However,  
3 the analysis that ERCOT is doing as a part of  
4 the request from the Public Utility Commission  
5 are being done with the same models and by the  
6 same team as is working on the future  
7 scenarios. So, incorporating that into our  
8 future planning is not going to be an issue.  
9 It is up to our stakeholders to fully vet out  
10 exactly what they want the various scenarios  
11 to look like.

12 MR. D. MEYER: Let's start with Ed  
13 and just go around the table.

14 MEMBER KRAPELS: It is a question  
15 for David. I have had the privilege of  
16 developing a couple of inter-area transmission  
17 projects between PJM and New York. I think I  
18 have learned that when PJM or New York or New  
19 England look at their reliability requirements  
20 for transmission or generation, they typically  
21 don't look to the next region to solve their  
22 reliability needs that they might have because

1 they can't predict how that region will  
2 behave.

3 In your modeling of inter-area  
4 reliability projects, what do you do about  
5 that specific problem that we have in the  
6 market today?

7 MR. WHITELEY: Well, again, we  
8 haven't actually started to do transmission  
9 studies yet, but that is one of the beauties  
10 of the EIPC because we will have both New York  
11 and PJM there to look at one case with one  
12 future set of resources and come up with a  
13 joint solution.

14 That means they will be looking at  
15 the situation together, and there should be  
16 one set of answers as opposed to two, which I  
17 think is where you might be headed with the  
18 question in the past.

19 I think that is one of the values  
20 of what EIPC is doing, because it helps inform  
21 the regional processes, as to what the  
22 potential future might look like, and I think

1 does support, you know, from some standpoint,  
2 the Order 1000 inter-regional coordination  
3 requirements, not that it solves them, not  
4 that interconnection planning is required in  
5 any sense, but, again, being informative of  
6 that process I think is a benefit that we will  
7 see. Again, we haven't done it yet, but that  
8 is the way I envision it unfolding.

9 MEMBER KELLIHER: Just a quick  
10 question for Warren. And I agree with Mike's  
11 observation that it is just different in  
12 Texas. The institutional barriers are lower,  
13 and it is the one place in the Lower 48 where  
14 you actually have unified regulatory  
15 authority. Everywhere else it is split.

16 But with respect to the CREZ  
17 lines, if permitting was fast-tracked, how has  
18 development proceeded post-permitting? Is  
19 everything on schedule, everything on track?

20 MR. LASHER: Yes, construction is  
21 generally on schedule. This is kind of an  
22 interesting aside to bidding out the process.

1 When they took in actual bids, the various  
2 transmission companies came in and said, this  
3 is how much we think it would cost us to build  
4 these lines and this is the schedule under  
5 which we think we can have them done.

6 And it was almost like a "Name  
7 That Tune". I can name that tune in four  
8 notes. I can name that tune in three notes,  
9 you know.

10 And so, the transmission  
11 companies, fairly early on in the process,  
12 committed to getting these things done  
13 extremely quickly. And once they were locked  
14 into that kind of a schedule, there was real  
15 incentive to make good on that.

16 I, myself, was really surprised at  
17 some of the schedules that they were  
18 proposing. We are on target for end of 2013  
19 having all or nearly all of those circuits in  
20 place and operational.

21 MEMBER KELLIHER: That's great.  
22 What about cost? If cost ends up being higher

1 than estimates, the developer has to prove  
2 that the additional costs were prudent?

3 MR. LASHER: Well, yes, they come  
4 back in for prudence, the costs do, when the  
5 line is used and useful. The costs are being  
6 tracked on a quarterly basis. There's  
7 actually a consultant who publishes a  
8 quarterly update, and that is available  
9 online. If you go to the Public Utility  
10 Commission website, there is a link to the  
11 website where they have these quarterly  
12 updates.

13 Costs have increased, mainly due  
14 to routing considerations and having to route  
15 around this or around that. For the most  
16 part, costs are tracking what the original  
17 cost estimates were.

18 MEMBER DUNCAN: Warren, as  
19 everyone has noted, the CREZ has been very  
20 successful in Texas during the time this has  
21 been being built out. However, the land rush  
22 has really started on the coastal zone for

1 wind power in Texas. I think like 1200  
2 megawatts is under development now. And we  
3 haven't even started the offshore development  
4 yet.

5 One of the reasons it started  
6 there is because you had transmission capacity  
7 coming out of the coastal zones going into the  
8 south and the Houston zones.

9 Given that, and that transmission  
10 is starting to fill up now, and there is a  
11 huge potential now on the coast and offshore,  
12 is there discussion or thoughts about a second  
13 round of CREZ being developed now, as you  
14 finish the western buildout?

15 MR. LASHER: It is a good thing  
16 Commissioner Smitherman isn't here. Yes, I'm  
17 not sure he would appreciate this joke, but,  
18 God, I hope not.

19 (Laughter.)

20 CREZ was a very rigorous and  
21 difficult process. To my mind, one of the  
22 reasons that we want a more robust, long-range

1 planning process is so that we can answer  
2 regulatory questions in a more timely manner,  
3 provide more timely information. So that we  
4 don't have to have this legislative mandate  
5 for some sort of different extra planning  
6 approach.

7 So, I would like to think that we  
8 will be in time to implement a longer view of  
9 the valley needs and the needs of the  
10 renewable energy in south Texas in order to  
11 inform the planning process and make good  
12 decisions along that route.

13 But you're definitely correct that  
14 new transmissions will be required in order to  
15 connect renewable resources in south Texas  
16 much beyond what is currently planned. So,  
17 there is a need for a significant study of  
18 those resources.

19 MEMBER NEVIUS: Two questions, one  
20 for all three of the interconnection-wide plan  
21 activities. Are you talking with each other  
22 and sharing experiences about how you are

1 going about these processes?

2 And the second question, and I  
3 guess this is mainly for the Eastern  
4 Interconnection, is, what kind of objective  
5 function is going to be used to determine what  
6 transmission would be built or what wouldn't  
7 be built, when you get into that phase of the  
8 analysis?

9 MR. WHITELEY: Well, I'll start  
10 since you had the second question for the  
11 East.

12 The view of what will be built is  
13 going to be based on reliability only. We are  
14 not going to try to do a market simulation and  
15 build transmission that is based on some kind  
16 of congestion metric, or whatever. It will be  
17 solely: here's the resource mix. How do we  
18 support it with a transmission system that  
19 meets our reliability criteria, essentially?  
20 We are not going through an exhaustive review  
21 of every standard, but certainly the typical  
22 N-1, N-2 planning standard kind of

1 requirements will be what we will be using.

2 In terms of sharing, what we are  
3 doing, yes, Brad and Warren and I have talked  
4 in the past. We have kind of exchanged  
5 information.

6 Brad mentioned the cost  
7 information that we put together. We worked  
8 on that together.

9 They have routes that are  
10 different. So, immediately there is not a  
11 lot that is shared across all three, but  
12 certainly the combined experience is being  
13 shared, I think, between the three  
14 interconnections.

15 MR. LASHER: I don't have anything  
16 to add to that.

17 MR. D. MEYER: Brad?

18 MEMBER ROBERTS: A real quick  
19 question for David. In your process, you  
20 showed demand response, and I didn't see  
21 storage mentioned anywhere in there.

22 MR. WHITELEY: I figured I was

1 going to get the storage question.

2 (Laughter.)

3 And I think the answer is similar  
4 to what Brad was explaining. Storage is not  
5 shown in our models as a resource option, and  
6 that is because of the unique characteristics  
7 of storage and the difficulty in modeling the  
8 energy-in/energy-out and prices.

9 So, we forced storage in in some  
10 levels, you know, in some amount, but it is  
11 not an economic option that is chosen. This  
12 is an expansion capacity model, basically,  
13 that we are running at this point. It is a  
14 pipe-and-bubble capacity expansion. And you  
15 have got resource options that it can choose  
16 from, you know, wind, solar, coal, combined  
17 cycle.

18 The problem is storage, because of  
19 those unique aspects, is not represented. I  
20 mean, that is one thing, one of the  
21 shortcomings of the model that we live with  
22 and try to work around.

1                   MR. D. MEYER: Brad Nickell, Peggy  
2 tells me you are still on the line. Do you  
3 want to add any comments, particularly on the  
4 dialog across interconnection lines/boundaries  
5 or what the groundrules are that you are using  
6 for addition of new transmission in the plans,  
7 and those questions?

8                   MR. NICKELL: Can you hear me  
9 okay?

10                  CHAIR COWART: Yes.

11                  MR. NICKELL: Okay. Great. Thank  
12 you.

13                  I don't have anything to add  
14 beyond what David Whiteley has explained on  
15 kind of ad hoc coordination amongst the three  
16 of us and lessons learned, if you will, on  
17 different point subjects.

18                  As far as transmission, when we  
19 look at different expansion options, there are  
20 a lot of proposed transmission projects in the  
21 West. So, we use that suite of known  
22 projects, around 90 of them, to serve as

1 proxies. And we did in our plan play them off  
2 of each other in a limited fashion from a  
3 capital cost perspective.

4 As we moved resource packages  
5 around, generation around the interconnection,  
6 based on stakeholder input, we matched that up  
7 with transmission projects to deliver that  
8 energy back to the major load centers. And  
9 really, from a reliability perspective, we  
10 used both our existing path ratings, path  
11 ratings that we have here in the West, and the  
12 good thing about using projects is most of  
13 them are sufficiently through some  
14 reliability-based planning that we know what  
15 their impact is, to what allowable commercial  
16 flows will be in the West. And so, we use  
17 those numbers as proxies for reliability in  
18 our production model and kind of play those  
19 off, and then look at the capital cost  
20 implications of different generation and  
21 transmission packages.

22 MR. D. MEYER: Sonny, do you have

1        comments?

2                    MEMBER POPOWSKY:    Yes, more of a  
3        comment than a question.    As Dave said, I am  
4        one of the 29 stakeholder representatives on  
5        the EIPC.    So, I did want to take the  
6        opportunity to commend Dave.    It really has  
7        been quite an incredible task because, as he  
8        said, you have 26 planning authorities and 29  
9        stakeholders.

10                    I think just getting the folks  
11        together, in the Eastern Interconnection, my  
12        sense is it has always been a little bit of a  
13        Tower-of-Babel-type situation.

14                    We are just getting the 26  
15        planning authorities to use the same  
16        terminology and the same definitions of, you  
17        know, what is a planned resource; what is a  
18        scheduled resource?    Compiling those just into  
19        what we called the rollout was quite a task.  
20        I thought that was going to be the simple  
21        part, was just to get the starting point.    But  
22        just getting the 26 planning authorities

1 together to put out what we called the rollout  
2 for the start of the analysis was a great  
3 task. I think that was of tremendous value.

4 And then, getting the stakeholders  
5 to operate on a consensus basis has been  
6 valuable, I think very valuable, certainly for  
7 folks like me, who wouldn't ordinarily be at  
8 those tables.

9 The only thing I would add is that  
10 I think, unlike the West and in ERCOT, where  
11 they are really, it sounds to me like they are  
12 really using this to plan their system -- like  
13 the West is putting out a 10-year plan, a 20-  
14 year plan. I think, Dave, you would agree  
15 that what we are really talking about is three  
16 hypothetical scenarios. We are not going to  
17 take these three scenarios, take these plans,  
18 and walk into state commissions or walk into  
19 FERC and say, "Here's what we should do."

20 These are really just exemplary,  
21 hypothetical scenarios as this is what it  
22 would look like if we tried to do

1 interconnection-wide planning. And hopefully,  
2 in the future, if this process continues, we  
3 can come up with actual not necessarily hard-  
4 and-fast plans, but at least ideas of what the  
5 regions could look at.

6 MR. WHITELEY: Yes, I would  
7 definitely agree with that. This is not the  
8 plan with a singular set of transmission  
9 facilities for the singular future that we  
10 think is going to happen. This is information  
11 that will be useful.

12 And thank you for the compliment.  
13 There's a lot of great people working in the  
14 East to try to make this happen. So, it is  
15 not just me.

16 MR. D. MEYER: Any other comments?  
17 Yes, we are scheduled to break for lunch soon,  
18 but Peggy says we have -- assuming people are  
19 willing to continue the discussion and delay  
20 lunch a little bit, we can accommodate a few  
21 more questions, if people have them.

22 CHAIR COWART: I just have one

1 comment, and it might lead to a question.

2 The comment, as I listened to  
3 these stories, is to commend the Department  
4 for giving the support that it gives to these  
5 planning processes. Because I don't know, at  
6 least for the eastern process, without the  
7 Department's support, I don't see how it would  
8 be happening.

9 And I noted the comment earlier  
10 about WECC creating a permanent mechanism for  
11 the planning process to be supported and  
12 participation by the relevant stakeholders to  
13 be supported over time. And I hadn't heard  
14 that such a thing is happening in just  
15 continued support for EISPC or the involvement  
16 of stakeholders in the East. And I wonder  
17 whether I just hadn't heard about it yet.

18 MR. WHITELEY: No, I think that is  
19 one where the jury is still out. But what I  
20 would say is that EIPC was formed really  
21 before the DOE issued its FOA and with the  
22 intention of enhancing the coordination

1 between the regional planning authorities in  
2 the East. And I don't think anything -- and  
3 I will look to my three bosses that are here  
4 to say if it is anything different than what  
5 I think it was originally formed as.

6 But, in terms of the jury still  
7 being out, we still don't know exactly what  
8 value we are getting out of this process in  
9 the East and how deep it needs to be and how  
10 intense the work needs to be. It could be  
11 that we have just scratched the surface of  
12 something very valuable, and we need to do a  
13 lot more. It could be that this is probably  
14 as much as you could reasonably do. It is  
15 hard to tell until we get a little further on  
16 into the real transmission planning work.

17 MR. D. MEYER: Let me respond  
18 briefly to the point that Rich raised. Pat  
19 and I both feel very strongly that it is so  
20 apparent that, especially with respect to  
21 transmission, like it or not, we are all in  
22 this together. The only way we are going to

1 get the transmission built that we know we  
2 need is through a lot of fruitful  
3 conversation, and it has to be informed by  
4 things like common vocabulary, common set of  
5 data, common understanding of what the real  
6 options are.

7 I think some of the people who  
8 came early on into this eastern process  
9 particularly, they thought they knew what some  
10 of the workable options were. I think they  
11 have learned that, hey, the range of workable  
12 options is not quite as broad maybe as they  
13 thought, that some things are going to work  
14 and be economic and other things are not, at  
15 least for a reasonable period of time.

16 But this kind of collaboration is  
17 essential. So, we can come up with different  
18 ways to do it, different institutional  
19 structures, different mechanisms, but the  
20 underlying need is still going to be there to  
21 get the relevant parties involved, to get them  
22 talking to each other, so that they can come

1 to some agreed-upon way of going forward.

2 MEMBER VAN WELIE: So, my view on  
3 this is that it has been enormously valuable.  
4 I also would like to commend David for the  
5 excellent work that you have done. You're  
6 right, there are a lot of good people working  
7 on this, but without you herding the  
8 squirrels, we wouldn't have a good product,  
9 and you have really helped achieve that.

10 I can't imagine this process  
11 ending. I think the planning authorities or  
12 coordinators can build into their budgets the  
13 ability to support this from a technical and  
14 analytical point of view. That just can  
15 include, I think, creating the venue.

16 The tricky part is going to be how  
17 to fund the states' involvement and all the  
18 other participants in the industry that wish  
19 to become involved. That is going to be the  
20 tricky part.

21 And then, two other thoughts. To  
22 the question to David on the fact that these

1 are not "the plan", I guess what it does do is  
2 set up the counterfactual, though, for  
3 policymakers. So, the business-as-usual-based  
4 case and the transmission buildout that goes  
5 with that gives people a view on what is going  
6 to happen without policy intervention in some  
7 way. And then, it is going to ultimately come  
8 back to policymakers to decide whether they  
9 like that outcome or not and whether they want  
10 to put their thumb on the scale and influence  
11 the outcome in some way. So, it is going to  
12 come back to, I guess, Congress and perhaps  
13 state legislatures to figure out whether they  
14 want to influence that outcome in some way.

15 MR. D. MEYER: Brad Nickell, if  
16 you are still on and you want to offer some  
17 perspective from the West on this, we would be  
18 happy to hear it.

19 MR. NICKELL: I will offer, I  
20 guess, a perspective. I think Doug Larson  
21 from the Western Interstate Energy Board might  
22 say something along this line, too, but,

1 obviously, I am not speaking for him.

2 From a state participation  
3 perspective, it is very, very important to  
4 have the regulators in the room. It is very  
5 important to have the Governors'  
6 representatives in the room.

7 And I look as this whole thing as  
8 it is a very big ball, it has got a lot of  
9 inertia, and we are a bunch of Lilliputians  
10 trying to move this big ball around and move  
11 it slowly in different directions. We can't  
12 stand in front of it, and we can't move it  
13 really quick, but if we all get behind it in  
14 certain directions, we can cause it to move.  
15 We need the state folks in the room and the  
16 provincial folks in the room to do that.

17 In the West here, we have an  
18 organization called the Western  
19 Interconnection Regional Advisory Body, or  
20 WIRAB, It is kind of under the same umbrella,  
21 under the WGA umbrella. And they do receive  
22 Section 215 funding, so that statutory

1 funding, the same funding vehicle that WECC  
2 uses for its budget.

3 And that is a possible funding  
4 vehicle and a business model, if you will, to  
5 use ratepayer-based funding to ensure that  
6 state folks have an opportunity to participate  
7 in planning activities.

8 MR. D. MEYER: Any final -- sorry,  
9 Bob Curry?

10 MEMBER CURRY: Yes, just a quick  
11 question, and this is, obviously, not  
12 addressed to Warren.

13 To what extent has FERC been  
14 involved, should it be involved at a different  
15 stage, if that is a practicality? Obviously,  
16 the ISOs, in my view, are sort of FERC's  
17 representatives on the ground. Don't take  
18 that personally, Gordon.

19 (Laughter.)

20 In the New York ISO, we expect a  
21 lot of coordination. But, ultimately, FERC is  
22 going to have in all likelihood an interstate

1 transmission, a say in how much money you can  
2 make from this. And that is going to be --  
3 pardon me for returning to money again -- that  
4 is going to be one of the essential elements  
5 that takes the concept to fruition in terms of  
6 developers.

7 And I just don't know. Is this  
8 the right time, wrong time? Is there ever a  
9 good time?

10 MR. D. MEYER: There's a two-part  
11 answer to that. First, FERC has attended --  
12 all of the meetings for these interconnection-  
13 level planning efforts are totally open.  
14 Everything is fully noticed, and anyone who  
15 wants to participate or to come to these  
16 meetings is able to do so.

17 And so, FERC has sent staff,  
18 senior-level staff in many times, to these  
19 meetings, East and West, and I'm not sure  
20 whether they have shown up at ERCOT or not,  
21 probably not. So, that's one point.

22 And they have, by their own

1 choice, these people have been very low-key.  
2 Sure, they talk to folks at the breaks, and so  
3 on. But in terms of the actual dialog, they  
4 have not participated. I think that is  
5 probably understandable.

6 The other point, though, is that  
7 after we launched this process, and after it  
8 seemed to get a very positive response from a  
9 lot of states and NGOs, FERC did bring out  
10 Order 1000. It launched the NOPR, and then  
11 the rule came out last July.

12 And some of the features of Order  
13 1000 were pretty significant in terms of how  
14 they matched up with some of the things here.  
15 That is, the directive in Order 1000 that  
16 regionally planning entities are going to talk  
17 to each other about lines that cross their  
18 shared boundaries, and that these regional  
19 planning entities will take, as Ed Krapels was  
20 mentioning, they will take state policies into  
21 account or local policies, for that matter, to  
22 the extent that they are reflected in law or

1 regulation.

2 And so, those things are being  
3 factors into these Order 1000 processes, which  
4 I think is a major step forward.

5 Other final comments?

6 (No response.)

7 No?

8 Well, thank you all. It has been  
9 interesting and valuable.

10 CHAIR COWART: Thanks, folks.

11 We will take our lunch break now.

12 We return at one o'clock.

13 (Whereupon, the foregoing matter  
14 went off the record for lunch at 12:12 p.m.  
15 and went back on the record at 1:07 p.m.)

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A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

1:07 p.m.

CHAIR COWART: As you all will recall, this year we had three meetings, face-to-face meetings of the full Committee, roughly, March, July, and October.

That leads us to a conversation that has two parts. The first, quickly, is, do you think three meetings a year for the full Committee is about the right amount? And secondly, is something like that array of dates roughly the right spread? So, just any reactions at all to that?

MEMBER REDER: From my perspective, I think three meetings a year seems about right.

CHAIR COWART: And there is certainly the expectation that the Subcommittees would be active in between those three meetings. And so far, the practice has been for those Subcommittee meetings to be done by conference call. That is not set in

1 stone anywhere. If a Subcommittee decided  
2 that it was important to do something  
3 different, then that is a conversation I think  
4 we should have.

5 MEMBER ROBERTS: In the previous  
6 Committee session before, we did hold  
7 testimony one time as a Subcommittee, but that  
8 was the only time we had an alternate meeting  
9 from the regular Committee meeting.

10 CHAIR COWART: And you said we  
11 held testimony? That was on the record and --

12 MEMBER ROBERTS: Yes.

13 CHAIR COWART: Okay.

14 MR. D. MEYER: On this question of  
15 how many meetings to have, I will be very  
16 blunt, very candid. It seems to me we have  
17 these face-to-face meetings, and they are  
18 excellent. The dialog is excellent. The  
19 material is a very substantive meeting. The  
20 feedback we get is good.

21 And people kind of get juiced-up  
22 and enthusiastic about things to do and

1 questions to address, and so on. Then we all  
2 go back to our day jobs and things sort of  
3 really tend to revert to a lower level of  
4 activity.

5 So, the question is, would going  
6 to, say, four meetings help ameliorate that or  
7 should we look to other kinds of solutions,  
8 mainly being much more aggressive about  
9 maintaining sustained activity at the  
10 Subcommittee level and putting more emphasis  
11 on that level of activity? So, I just want to  
12 get some discussion of that.

13 Obviously, these meetings are not  
14 free. There is a dollar cost for us  
15 associated with putting one on. Even the room  
16 rent for this facility is pretty darned good  
17 now, thanks to Rich's organization. And we  
18 don't know whether that is going to continue  
19 to be available the way it has been. I mean,  
20 this room is heavily utilized. So, it raises  
21 a scheduling problem in its own right.

22 So, bear that in mind when you

1 think about how frequently we should meet.

2 CHAIR COWART: Tom?

3 MEMBER SLOAN: Yes. Many of you  
4 interact with the DOE on a fairly regular  
5 basis. For my constituency, and I am not  
6 speaking about my State constituency, I am  
7 talking about the fact that I carry  
8 information and issues back from here to two  
9 of the larger national legislative groups,  
10 NCSL and CSG, on a regular basis. For me,  
11 more frequent interactions with you, where I  
12 can get a larger scope of information allows  
13 me to transmit or communicate that to my  
14 broader audience.

15 So, I mean, cost and time and all  
16 being manageable, four meetings is preferable  
17 to three. Certainly, three is preferable to  
18 two or something of that nature.

19 CHAIR COWART: Mike?

20 MEMBER HEYECK: You have heard  
21 this, David, from me, that we have a chicken-  
22 and-egg problem here. We kind of decide what

1 we do, and we do it. I would like to avoid  
2 the subjects that are not unlike world hunger.  
3 Like federal siting is probably near that  
4 world hunger type of perspective, but some  
5 other things are not. And we have good dialog  
6 about those.

7 I really think that there needs to  
8 be more of an interface with the Department,  
9 I'll say, key leadership, like Bill Parks,  
10 like Merrill, like those individuals that are  
11 below you that happen to know where the gaps  
12 are or what keeps them up at night, for us to  
13 address.

14 Now we are free to address  
15 anything we want sort of within the rules, but  
16 I would really like to work on things the  
17 Department would like us to opine on. I can  
18 give you a lot of examples of those, the one  
19 being we talked about next-generation EMS  
20 systems. This is really going to be a key  
21 player, for example.

22 I don't know what the Department

1 is doing. I do know what EPRI is doing. So,  
2 we could have some dialog as to who is doing  
3 what.

4 And the grid security paper that  
5 was written, the first time I brought it to  
6 this Committee, they said, "Hey, find out what  
7 everyone else is doing." And with a lot of  
8 players, Dave, I found out what NERC was  
9 doing. And instead of this big, it turned out  
10 to be this big.

11 And you presented here what I call  
12 the gaps. So, somehow a dialog to figure out  
13 what the gaps are in the key areas.

14 MEMBER REDER: And picking up off  
15 of Mike's comment, I agree wholeheartedly. I  
16 think in many respects there is already  
17 analysis that is going on within DOE. To the  
18 extent that we have a mechanism to bring that  
19 into the Subcommittee conversations and  
20 leverage that, build upon it so it becomes a  
21 very collaborative, iterative process, it  
22 would probably be more fruitful in the end.

1                   So, you know, if we could figure  
2                   out points of contact in order to reach out,  
3                   what others departments, where do the  
4                   expertise and the analysis reside, would be  
5                   very useful. So, that was one comment.

6                   And the other comment is, going to  
7                   the space, a different topic, perhaps there is  
8                   an opportunity to use the Virginia Tech space  
9                   across the street from the Westin. So, we are  
10                  working on that as an option.

11                  MEMBER KELLIHER: From my  
12                  observation, looking at other advisory  
13                  committees, I think advisory committees are  
14                  most effective when an agency has some  
15                  decision or decisions that are in the queue  
16                  and they realize that advice outside the  
17                  government, some expert advice outside the  
18                  government from a balanced group, would help  
19                  the government make a decision.

20                  But, unless there is that kind of  
21                  connection between some impending decision and  
22                  the outside expertise, then advisory

1 committees sometimes aren't all that  
2 productive. They become general educational  
3 fora where sometimes it is the advisory  
4 committee members educating each other more  
5 than the government or the government  
6 educating the advisory committee members. And  
7 they end up having some momentum of their own,  
8 but not really doing what -- the purpose of  
9 the Federal Advisory Committee Act is to  
10 improve the quality of government decisions.  
11 It is not to educate advisory committee  
12 members.

13           And I am not just clear what are  
14 the decisions in the Department that are  
15 pending or impending, somehow in the queue,  
16 that you would like the advice from the  
17 Advisory Committee. And I think that is the  
18 purpose of an advisory committee.

19           SECRETARY HOFFMAN: Let me just  
20 add some thoughts to that. I mean, I will  
21 tell you, for example, with the microgrid  
22 program, what we will be looking at is, where

1 do we want to go next with that program? So,  
2 the discussion and what are the issues  
3 surrounding the value of microgrids I think  
4 was extremely helpful.

5 For energy storage, it has been a  
6 however-long debate on how to value energy  
7 storage and how to address that.

8 And as Ralph brought up, the  
9 Department is looking at an exercise. We had  
10 a meeting looking at the value of energy  
11 storage.

12 So, actively giving value to  
13 topics that are under great discussion and  
14 great debate within the Department, even if  
15 there is not a, quote/unquote, "decision" at  
16 this moment in time, it is helping us work  
17 towards some decisions and directions on where  
18 we are heading.

19 So, from that perspective, I think  
20 it is very valuable to us from a strategy  
21 perspective of where we are heading with our  
22 program and the activities we are working on,

1 and the analysis that we want to take in the  
2 future, whether it is for the Department or  
3 Congress or anybody else. So, I would just  
4 add that.

5 But I will go back and say that we  
6 will continue to strive to try and pull  
7 together where some of the directions or some  
8 of the issues that we are trying to deal with,  
9 and how the Committee can add value.

10 I will go back and pull up -- Mike  
11 is talking about the high-impact, low-  
12 frequency discussion for good security. One  
13 of the things that we are developing is  
14 actually a plan on how to determine some of  
15 the GMD issues and develop a framework for the  
16 industry as well as the Department on looking  
17 at that, in cooperation with what NERC is  
18 doing.

19 So, one of the things that I had  
20 talked to Rich during the break about was  
21 actually having a series of presentations on  
22 the topic, as well as presenting our strategy

1 for what we want to do in that, to get  
2 everybody's feedback.

3 So, I think we are going to slowly  
4 work into some more things, and I will do my  
5 best to kind of pull it back to home on where  
6 is the value that we are getting out of that.

7 CHAIR COWART: Wanda?

8 MEMBER REDER: One other comment.  
9 I think it would be useful if there was a  
10 mechanism for a feedback loop. So, once we  
11 get the paper submitted, just some  
12 understanding of if they are useful or if  
13 there is incremental work to be done, it would  
14 be a useful Subcommittee activity.

15 And I will say on the other point  
16 of view, what we talked about doing in future  
17 meetings was actually getting more of DOE  
18 staff and relevant staff directly  
19 participating with the Committee in  
20 communication, so that you actually can see  
21 some of that direct feedback into the  
22 discussions and what is going on versus kind

1 of relaying it.

2 So, one of the things we are going  
3 to try to do is pull more of the Department  
4 and more of the other relevant federal  
5 government folks to the meeting, depending on  
6 the topics that are covered.

7 CHAIR COWART: So, I will just  
8 summarize what I think I heard, just for our  
9 mutual benefit, of really three different  
10 things.

11 The first is that we would like  
12 -- and I have asked Pat to help us do this,  
13 Pat and David both -- for each of the  
14 Subcommittees to be connected to senior  
15 Department officials who have active work  
16 ongoing directly related to the general topic  
17 of the Subcommittee. So that, even between  
18 meetings, there would be a liaison in the  
19 Department who is actively working on those  
20 topics.

21 So, that is the first thing. And  
22 the Subcommittee Chairs know to look out for

1 that and to kind of follow up on that request.

2 The second point is something that  
3 I think many of us have said and Pat has  
4 acknowledged. We are going to be most useful  
5 as an Advisory Committee if we are plugged  
6 into either pending decisions, as Joe just  
7 pointed out, or at least work streams that  
8 could use guidance from the Committee as to  
9 what direction the work stream should go.

10 And that, whenever possible, we  
11 ought to be focusing on asking for and getting  
12 an indication of what is the decision or what  
13 is the work stream that the Department is  
14 soliciting feedback on.

15 And then, the third point is that  
16 communication in between meetings, both on the  
17 Subcommittees and between the Subcommittees  
18 and the relevant DOE staff, should be fluid  
19 and bidirectional.

20 The reference was made in our  
21 leadership team conversation yesterday about  
22 creating documents and throwing them over the

1 wall, and wondering what happens on the other  
2 side. It is not necessary to be in that mode.  
3 We ought to be in a much more bidirectional  
4 mode.

5 I judge that all of those requests  
6 have been heard.

7 MEMBER CAVANAGH: I guess I would  
8 second Joe's comments. I was trying to get  
9 your attention a second earlier.

10 You know, you may want to  
11 reconstitute a little bit, too, if this is the  
12 time to look at the next year. I mean, I, for  
13 one, will acknowledge that I am an engineer,  
14 and, Pat, I am not going to provide you a lot  
15 of great information on how to figure out the  
16 next steps in R&D. But there are a lot of  
17 other people around the table who are and  
18 other people who could take my place, and fine  
19 with that, if that is sort of the focus, is  
20 kind of the next steps in R&D.

21 In the past, this group has talked  
22 about, I would say, much more sort of broad

1 national policy on how transmission is of  
2 critical importance to a variety of national  
3 goals, and that raises a lot of policy issues.  
4 I know I, for one, would like to be involved  
5 in that. If we are not going to do that, then  
6 maybe we could look at some different groups  
7 and smaller committees or differently-  
8 constituted committees.

9 SECRETARY HOFFMAN: I don't think  
10 we are eliminating any of the policy  
11 discussions from this group. So, I think we  
12 would just continue to rotate what some of the  
13 topics are that are relevant to the  
14 discussions.

15 CHAIR COWART: All right. Are we  
16 good?

17 Yes, in terms of the schedule, I  
18 gather by looking at faces and hearing no  
19 objections, that the notion of three meetings,  
20 roughly as we had in 2011, would suit the  
21 Committee.

22 And what we will do is just sit

1 down with David and Peggy and just try to set  
2 some dates, and we will send you an email with  
3 those dates, and in order to avoid the major  
4 potential conflicts that we know about.

5 MEMBER ROBERTS: Just one  
6 additional comment on that, on the three  
7 meetings.

8 CHAIR COWART: Uh-hum.

9 MEMBER ROBERTS: I think having a  
10 day and a half, if we are going to just do  
11 three. I don't think you would do more than  
12 four, but one day is just a little too tight.

13 CHAIR COWART: Okay. Good advice.  
14 Thank you.

15 All right. Yes, the next topic,  
16 actually, is the Transmission Subcommittee.

17 Mike?

18 MEMBER HEYECK: We actually have  
19 two memorandums that we are going to be  
20 looking at, none of which involves world  
21 hunger.

22 (Laughter.)

1           So, I just wanted to make another  
2           comment about the resources around the table.  
3           I think Merrill mentioned CIGRE this morning.  
4           You have a pipeline into me through to CIGRE,  
5           if you need. I am the U.S. President of the  
6           National Committee of CIGRE, and Wanda is very  
7           active in IEEE. So, there is more conduit  
8           around this table than just our companies.

9           There are two memorandum. One is  
10          the grid security memorandum. Last meeting,  
11          the Committee has provided advice to find out  
12          what everyone else is doing, and I mentioned  
13          that I visited with Dave; also, Gerry Cauley  
14          and John Procaro, and actually participated  
15          in the meeting of the Security Task Force --  
16          I don't know exactly the name -- to try to  
17          find the gaps.

18          And the gaps included, and that  
19          Committee agreed -- whether this Committee  
20          agrees, we will find out in a few minutes:

21                 One, determine specific grid  
22          vulnerabilities to HILF events and cyber

1 attacks. We figure that the labs are very  
2 useful in determining how to harden these  
3 assets, which is the second one.

4 It is to develop grid component-  
5 hardening standards.

6 And the third is to develop  
7 specific gaps in sparing the critical  
8 components. The industry already spares  
9 transformers to some degree. And this  
10 exercise would be to identify gaps in those.

11 And I know that Barry was kind  
12 enough to offer some comments through Rich.  
13 I just wanted to give Rich the first  
14 opportunity to provide those comments and to  
15 see if the Committee agrees.

16 And then, if there is anyone else  
17 who wants to provide comments, please put your  
18 name tent up.

19 MEMBER R. MEYER: I can't be funny  
20 more than once.

21 (Laughter.)

22 The regular teach is out today,

1 and I am just the substitute teacher. No one  
2 really has to listen to me, you know. I get  
3 to take attendance at best, and that's it.

4 If you look at the document that  
5 has been previously distributed to you, not by  
6 us, but through the formal mechanism, I direct  
7 your attention to the third page first. We  
8 have a number of small changes. I believe  
9 they are small changes.

10 Item that is marked No. 3 on the  
11 third page, the first sentence says, "The  
12 electricity industry via EEI and NERC". We  
13 suggest a change there, that it say, "The  
14 electric industry and NERC or the electric  
15 industry via EEI and other sectors".

16 To be sure, we work very closely  
17 with EEI on these matters. So, this is not an  
18 NRECA/EEI issue. So, I just want to raise  
19 that issue first. I leave it up to the  
20 leaders at this meeting to decide when to  
21 consider that issue or not.

22 Very good. And then, on page 2,

1 if you look at, this appears at the bottom of  
2 page 2. In both Items 1 and 2, there are  
3 references to standards. Whenever there are  
4 references to standards, we recommend changing  
5 the word "standards" to "guidance/best  
6 practices".

7 MEMBER HEYECK: Any objections to  
8 that?

9 (No response.)

10 I think standards are, let's just  
11 say, misinterpreted these days. Would  
12 guidance and best practices be suitable?

13 Okay. Anytime the word  
14 "standards" appears.

15 MEMBER R. MEYER: Similarly, on  
16 the second paragraph of page 1, the word  
17 "standards" appears there. And unfortunately,  
18 Barry and I did not have a chance to chat  
19 about this prior to this meeting or even at  
20 this meeting. There he has a change from  
21 "standards" to "R&D and guidance".

22 I have no particular feelings

1       there. I certainly defer to others around  
2       this table. I don't know if "R&D and  
3       guidance" would be best there or if that  
4       should also say "guidance/best practices".

5               CHAIR COWART: Why don't we say  
6       "R&D, guidance, and best practices"?

7               MEMBER R. MEYER: That would  
8       certainly be fine with NRECA.

9               MEMBER HEYECK: Is that all, Rich?

10              MEMBER R. MEYER: And the final  
11       change, and I want to emphasize that we are  
12       making this point solely within the context of  
13       grid security, in the middle of the second  
14       paragraph on the first page, it says, it  
15       appeared to say -- again, I'm not sure of the  
16       language that was in this draft originally.  
17       There was a reference to, let's see -- does  
18       anyone's draft say, "However, the grid is ill-  
19       prepared"?

20              MEMBER HEYECK: Yes.

21              MEMBER R. MEYER: Okay. So, the  
22       suggested language is to remove the phrase

1 "the grid is ill-prepared" and substitute  
2 instead, "However, further work is needed to  
3 better understand potential steps for  
4 addressing widespread high impact."

5 MEMBER HEYECK: Any objections?

6 (No response.)

7 "Further work is needed to" --

8 MEMBER R. MEYER: "However,  
9 further work is needed to better understand  
10 potential steps for addressing...." And then  
11 it continues, "widespread high impact".

12 MEMBER HEYECK: Okay.

13 MEMBER R. MEYER: And I will give  
14 a hard copy of this to Peggy because she asked  
15 me to.

16 (Laughter.)

17 So, thank you all for your  
18 consideration. Much appreciated.

19 MEMBER KRAPELS: For the record, I  
20 object to the split infinitive "to better  
21 understand".

22 (Laughter.)

1                   MEMBER ROBERTS: I have a question  
2                   real quick.

3                   MEMBER HEYECK: Go ahead.

4                   MEMBER ROBERTS: I wrote a note on  
5                   No. 3 on critical spares. Just out curiosity,  
6                   are there certain size transformers that are  
7                   not even built in the United States anymore?

8                   MEMBER HEYECK: Actually, if you  
9                   go beyond transformers, it would be electronic  
10                  equipment. Because in HILF events, you could  
11                  pretty much fry some relaying or digital  
12                  relaying and things like that. So, the issue  
13                  here is to identify gaps in what needs to be  
14                  spared. And certainly relaying is something  
15                  that is not a long-term, long-lead-time item.  
16                  However, it is really just to identify gaps.

17                  MEMBER ROBERTS: I was just  
18                  curious about transformers. I mean, are there  
19                  certain sizes that are not even built in this  
20                  country anymore?

21                  MEMBER HEYECK: Yes. Yes, 765 kV  
22                  transformers, for example, are not built here;

1 345 kV, there's a few plants, but not many.  
2 St. Louis. Actually, Hyundai has announced  
3 something for Alabama or Tennessee, I think.  
4 So, they are some that are developed out  
5 there.

6 Any other comments?

7 (No response.)

8 Any objections to moving this  
9 forward?

10 (No response.)

11 CHAIR COWART: I hear no  
12 objections. So, we can record that this  
13 recommendation has been unanimously approved  
14 by the Committee.

15 MEMBER HEYECK: Thank you.

16 The second item is titled,  
17 "Interdependence of Electric System  
18 Infrastructure and Natural Gas  
19 Infrastructure".

20 First, I want to acknowledge Barry  
21 Smitherman has actually led these efforts, and  
22 he could not be here for this meeting.

1                   You have that document before you,  
2                   and I will refer you to page 4, where our  
3                   recommendations are outlined.

4                   But the essence of this is that  
5                   firming-up electric capacity is not linked to  
6                   the firming-up of the capacity in the gas  
7                   pipes, and there needs to be a linkage between  
8                   the two; otherwise, we are going to have a  
9                   reliability issue with the grid.

10                  At this time, I will open this up  
11                  to comments as well.

12                  But it became very evident in the  
13                  Texas cold snap with respect to the electric  
14                  side, but I think we extended it because there  
15                  is a gap between firming-up electric capacity  
16                  to the market and the gas supplier firming-up  
17                  capacity to the plant.

18                  And many of you know, if there is  
19                  an emergency out there, I think in many states  
20                  the Governor can declare an emergency, and the  
21                  firm capacity, even if you declare it firm,  
22                  could be negated by a Governor's action. So,

1       there seems to be a disconnect between  
2       electricity supply and fuel supply.

3                       Comments?   Ed?

4                       MEMBER KRAPELS:   Yes, Mike, on  
5       page 5, Recommendation No. 3 seems a little  
6       out of place.   Why should DOE fund research on  
7       the use of natural gas?   What is the purpose  
8       of the research?   Can it be defined more  
9       precisely than that?   Surely, natural gas will  
10      be the fuel of choice to replace retiring coal  
11      plants.

12                      I don't know; it just seemed just  
13      thrown out there without more elaboration and  
14      definition of what DOE is supposed to do with  
15      that big question.

16                      MEMBER HEYECK:   And from my  
17      perspective, I think "research" is probably  
18      too strong a word to use.   I think this is  
19      more planning, looking at capacity, rather  
20      than researching.   So, "should fund planning"?

21                      CHAIR COWART:   Actually, I think  
22      what you mean is planning on the likely use of

1 natural gas or on the potential for natural  
2 gas to replace all the coal-fired generation.

3 Whoops, my microphone was not on.  
4 Sorry.

5 I think that is what is intended.  
6 It is not research on how gas can do it, but  
7 it is research on the degree to which gas is  
8 likely to be called upon and relied upon to do  
9 it.

10 MEMBER KRAPELS: And the policy is  
11 that you are straining the natural gas  
12 infrastructure system --

13 CHAIR COWART: Correct.

14 MEMBER KRAPELS: -- by asking it  
15 to play this role. Maybe if we could use some  
16 of those kinds of words there?

17 MEMBER DELGADO: But, beyond that,  
18 it is also being aware that this issue exists  
19 that puts in jeopardy what is the bulk of the  
20 new generation; that at critical times when  
21 there is alternative need, the generation may  
22 not have fuel. So, this is an issue that has

1 to be addressed because, as gas become a  
2 humongous portion of the intermediate and  
3 base, then this can be a significant problem.

4 CHAIR COWART: We have got such a  
5 strong interest here. Let's start back here.  
6 Gordon?

7 MEMBER VAN WELIE: I was just  
8 going to suggest that we delete 3 and insert  
9 it as a bullet under 1. Because, essentially,  
10 when you are looking into the dependency  
11 issue, one of the things one ought to be  
12 evaluating is an increased dependency on  
13 natural gas as a result of retirements of all  
14 the coal units.

15 CHAIR COWART: Do you have  
16 language to suggest? Why don't I ask you to  
17 see if you can write that bullet? And then,  
18 in a minute, we will come back to it.

19 Wanda?

20 MEMBER REDER: Yes, I notice that  
21 it could perhaps be strengthened by commenting  
22 on the transparency or visibility across

1 domains. A lot of this is policy-oriented,  
2 and I think from an operations perspective we  
3 probably need better visibility. And perhaps  
4 we could incorporate that in the  
5 recommendation, No. 1, the coordination.

6 Mike, what are your thoughts?

7 MEMBER HEYECK: I like inserting  
8 the word "transparency". So, if you would  
9 like to insert the word "transparency", take  
10 your document out and put an up caret and  
11 figure out where it is going to be.

12 MEMBER REDER: All right. You've  
13 got it.

14 CHAIR COWART: Roger?

15 MEMBER DUNCAN: Just a quick  
16 anecdote to illustrate the severity of the  
17 point. During our outage, statewide rolling  
18 blackouts in February in cold weather, where  
19 we lost several power plants and gas was  
20 curtailed, one of the things that happened  
21 under the existing rules is that several gas  
22 pumping stations running on electricity were

1 cut off.

2 CHAIR COWART: And Joe?

3 MEMBER KELLIHER: Yes, I think on  
4 that last point, I think the southwestern  
5 issue is more electric causing the gas  
6 problem, not the reverse. Normally, we think  
7 of it as the opposite.

8 But I don't really understand what  
9 No. 2 is saying. And this is actually not a  
10 new issue of should the gas and power day line  
11 up. It first arose in New England in 2005 or  
12 2006, and FERC has asked this question at  
13 least twice and has been reassured by ISO New  
14 England and others that the two days don't  
15 have to match up, unless things have changed  
16 since I have been paying attention.

17 But it is not as if gas is not  
18 available on a firm basis. It is. But if you  
19 don't know for sure you are going to be  
20 selling, you don't typically buy gas on a firm  
21 basis.

22 So, I am not sure what No. 2 is

1 saying because gas is available on a firm  
2 basis, but is No. 2 suggesting generators  
3 should be required to buy gas on a firm basis,  
4 and those costs should somehow be borne by  
5 them if they don't get dispatched? Or those  
6 costs should be socialized somehow?

7 I'm not clear. No. 2 doesn't seem  
8 to be saying that all gas sales to generators  
9 must be firm. It doesn't seem to be saying  
10 that. But I am not sure what it is saying,  
11 short of that.

12 MEMBER VAN WELIE: I guess I will  
13 just give my view. I don't believe that one  
14 needs to have all gas generation be firm. The  
15 New-England-specific issue is some quantity  
16 about gas-fired generation we think needs to  
17 have either an alternate fuel supply or local  
18 storage, or something to be able to ride  
19 through a temporary interruption of gas supply  
20 into the New England region.

21 So, how we solve that problem, we  
22 haven't yet arrived at a solution just yet.

1 But it seems clear to us that the work that we  
2 have done in the past 10 years to sort of try  
3 to increase the coordination between the gas  
4 system and the electric system has helped  
5 matters, but it has not solved the problem.

6 And in fact, as we look forward  
7 and see that a large percentage of our oil-  
8 fired capacity will retire in the next five  
9 years, that is likely to be replaced by more  
10 gas-fired generation. So, this problem is  
11 sort of expanding, at least in the New England  
12 context.

13 My perception is, looking at what  
14 is happening elsewhere in the country with low  
15 natural gas prices, it is even displacing coal  
16 generation in the Mid-Atlantic area,  
17 particularly all the smaller, less-efficient  
18 coal units.

19 So, I think that the dependency  
20 between the two systems will grow over the  
21 time. The question is, what is the mechanism  
22 to ensure electric reliability? And at the

1 moment, in my view, the market designs are not  
2 expressing that need in any way. Once you  
3 express that need, you create the revenue  
4 stream for somebody to do something about  
5 that.

6 So, that is directionally how we  
7 are going to be addressing this from the New  
8 England point of view. I am not sure, whoever  
9 wrote this paragraph, what they had in mind,  
10 whether they had in mind something that was  
11 consistent with what I just said or whether  
12 they had some different objective in mind.

13 CHAIR COWART: I think it is  
14 consistent with what you just said. From a  
15 prior conversation, I recall the phrase being  
16 consciously added here to the first bullet in  
17 No. 2, "when required to maintain power system  
18 reliability". In other words, meaning not to  
19 suggest that all gas gen has to be firm, but,  
20 rather, when it has been determined that there  
21 is an explicit reliability need. That was the  
22 intent, anyway, of the author.

1                   MEMBER KRAPELS: Can I just ask a  
2 clarifying question?

3                   Gordon, does FERC or does anyone  
4 in the regulatory arena now give you any form  
5 of warning if there are concerns on the gas  
6 supply side that it might impact electricity  
7 generation in New England?

8                   MEMBER VAN WELIE: No. So, there  
9 is no centralized structure for giving us any  
10 kind of warning. We have had to develop over  
11 the years the ability to try as best as we can  
12 find out what is happening on the gas system.  
13 I mean, cooperation between us and the gas  
14 industry has increased substantially over the  
15 years.

16                   I still personally think we are  
17 sort of doing this in a 1970s' style manner.  
18 We have on our control desk people who are  
19 scanning the gas pipeline bulletin boards,  
20 filling out spreadsheets, and trying to sort  
21 of come up with a fairly rough-and-ready  
22 estimate of whether there is enough in the

1 system.

2 And so, we use that information  
3 combined with coal's, with the pipeline  
4 operators, to sort of get a sense of where we  
5 are. And then, we will make our commitment  
6 decisions.

7 The reason I use this sort of  
8 1970s'-style analogy is that here we are on  
9 the electric system with transducers all over  
10 the place. We are putting PMUs out there. We  
11 want to understand electric system reliability  
12 down to the millisecond. And yet, we are  
13 sitting here scratching around trying to find  
14 out what is happening with our most important  
15 fuel supply. It just doesn't seem to me to be  
16 a balanced situation from an operational point  
17 of view.

18 MEMBER HEYECK: I think if I have  
19 to put this simply, it is to define the gaps  
20 between ensuring electric reliability and  
21 ensuring the gas is there for electric  
22 reliability.

1                   And then, there is the  
2                   alternative, which Roger mentioned, to make  
3                   sure that, to the extent that gas is dependent  
4                   upon electricity, that we consider it a  
5                   critical load.

6                   I think those are really the two  
7                   things we are struggling with.

8                   CHAIR COWART: So, I think we have  
9                   two pending amendments. Gordon has his pen  
10                  out for one of them, I think, and Wanda was  
11                  working on another one. Is that right?

12                  MEMBER REDER: Yes, I can read it  
13                  off.

14                  It will be a bullet that goes at  
15                  the bottom of No. 1. "Appropriate  
16                  transparency and visibility to support  
17                  reliable operations across the domain".

18                  MEMBER DELGADO: That's beautiful.

19                  MEMBER REDER: What, Jose?

20                  MEMBER DELGADO: Gosh, that's  
21                  beautiful.

22                  (Laughter.)

1 CHAIR COWART: Beautiful.

2 David?

3 MEMBER NEVIUS: This is another  
4 place where you might want to make reference  
5 to an update to our gas/electric  
6 interdependency study, which is getting off  
7 the ground now. There is going to be an  
8 informational presentation on it to our Member  
9 Representatives Committee next Tuesday.

10 Again, we had done something a  
11 couple of years ago, and this is an update,  
12 taking into account the new situation and  
13 increased use of gas, and so on. So, the  
14 agenda for that conference call meeting is on  
15 our website under the Member Representatives  
16 Committee, and I think it is two o'clock on  
17 the 25th of October.

18 But if somebody wanted to just sit  
19 in on that, or at least just look at the  
20 background material, it will give you an  
21 update of what we are doing. And if you want  
22 to put some reference or link in here, it

1 probably would be useful.

2 MEMBER KRAPELS: David, can I ask  
3 you a question? Is there such a thing as a  
4 North American Gas Reliability? Maybe there  
5 should be.

6 MEMBER NEVIUS: We have worked  
7 with the Natural Gas Supply Association, and  
8 we have worked with the Interstate Natural Gas  
9 Association in the past.

10 One of the points that Gordon was  
11 making is -- or excuse me, I think it was  
12 Roger was making -- is the dependence of gas  
13 systems, pipelines, compressor stations, on a  
14 reliable supply of electricity is something we  
15 addressed back in the early nineties along  
16 with NGA. We had a coordination study.

17 And what we found is in many cases  
18 the utilities didn't know who was behind some  
19 of the meters, and they may have been  
20 compressor stations. And even though they  
21 were gas-powered compressor stations, they had  
22 electric controls.

1                   So, when you got into a load-  
2 shedding event, the utility may inadvertently  
3 cut off load for that meter or cut off that  
4 meter, not knowing that they are actually sort  
5 of cutting off or reducing their throughput  
6 gas supply. There was a specific instance.

7                   So, we actually developed a  
8 recommendation. The NGA Operating Committee  
9 and NERC Operating Committee adopted a  
10 resolution -- it was either 1993 or 1994 -- to  
11 address that. Unfortunately, it didn't  
12 address the intrastate gas pipeline system.  
13 I think in the cold snap there may have been  
14 some issues related to cutting off firm load  
15 that affected some intrastate gas facilities,  
16 both processing and compressor stations. So,  
17 that something, a gap that needs to be closed.

18                   But, in any event, we are looking  
19 at that again.

20                   CHAIR COWART: If you can provide  
21 us with a single sentence reference that we  
22 can insert here, just basically as a footnote,

1 that would be fine. And if that is all right  
2 with the Committee, we will make a point of  
3 adding that as a footnote.

4 And I am taking it one step at a  
5 time. Wanda's language is acceptable to  
6 people?

7 Without objection, it will be put  
8 in.

9 And now Gordon.

10 MEMBER VAN WELIE: So, I am happy  
11 for someone to come up with better words than  
12 this. I have included an additional sentence  
13 in the last bullet under 1.

14 So, the last bullet reads,  
15 "Periodic reassessment of the status of  
16 interdependent infrastructures to determine  
17 whether shifts in technology or policy have  
18 changed their relationship with one another."

19 New sentence: "Such assessment  
20 should include an evaluation of whether the  
21 retirement of existing electric generation  
22 will result in the development of additional

1 gas generation and thereby place greater  
2 demands on the natural gas system", or  
3 something in that vein.

4 Because that is, I think, the  
5 issue: as older units retire, and it could be  
6 oil, it could be gas. It could be oil or coal  
7 or even nuclear, actually, in some cases. My  
8 perception of this is we will see the gas  
9 replace that.

10 MEMBER HEYECK: That means we  
11 strike Point 3?

12 MEMBER VAN WELIE: Point 3 and  
13 just include as essentially an additional  
14 sentence under 1.

15 CHAIR COWART: Is that amendment,  
16 Mike? Yes? Any objection?

17 (No response.)

18 Done.

19 Would you please deliver your  
20 handwriting to Peggy? Thank you.

21 Are we ready to move adoption of  
22 this recommendation?

1 All right. I am seeing unanimous  
2 support. So, I don't need a motion and a  
3 second, and all that, right?

4 Unanimously adopted. Thank you  
5 very much.

6 I think Pat has a couple of words  
7 to say on this topic.

8 SECRETARY HOFFMAN: I guess I just  
9 want to thank you for both of these memos to  
10 the Department. And since I actually had a  
11 chance to read the draft, which gave me some  
12 time to think about some of the things that we  
13 should do in response to the memos.

14 And David and I have talked  
15 whether at the next Advisory Committee meeting  
16 or we set up some phone calls to, No. 1,  
17 discuss some of the tools and some of the  
18 framework document of what the Department is  
19 looking at with respect to the high-impact,  
20 low-frequency-type events, specifically GMD.  
21 Specifically, how are we developing some  
22 toolsets so we could have a wider area of

1 visualization of the some of the  
2 interdependencies? We are developing some  
3 tools in that area.

4 I would love for the Committee to  
5 see some of the things we are working on and  
6 then provide us some advice back on our  
7 strategy and our thoughts and our directions  
8 in this area, in addition to maybe getting  
9 some highlights on what NERC is doing, for the  
10 Committee to understand that.

11 The gas and interdependency issue,  
12 one of the things, as I was reading the draft,  
13 which I apologize I actually had an earlier  
14 version of it, was looking at getting TSA from  
15 the safety point of view, and also inviting  
16 FERC, and actually have a discussion on some  
17 of the reliability and some of the firming and  
18 impacts. And we could have that. We could  
19 have an offline discussion first and see, so  
20 we can keep things moving. So, we actually  
21 can flesh out some of the discussion before we  
22 actually do it for a full Committee meeting.

1                   But we are going to talk about  
2                   some further ideas in this area. But I did  
3                   want to tell you that at least there were some  
4                   thoughts starting to gel, based on the memos  
5                   coming to DOE.

6                   MEMBER HEYECK: And if I may add  
7                   -- Pat, thank you for your comments -- as I  
8                   said yesterday, we have about a third of our  
9                   assets on the electric side that are at or  
10                  near life, and we are going to have to replace  
11                  them. We need to replace them in a smart way  
12                  that doesn't break the bank from a consumer  
13                  perspective, but replace them in a smart way  
14                  for security, efficiency, and technology  
15                  reasons.

16                  CHAIR COWART: All right. Let me  
17                  say thank you to the Subcommittee for this  
18                  work, and to Barry, who led on this natural  
19                  gas paper. And congratulations to you all.

20                  Now we are going to be roughly on  
21                  schedule because it turns out that there is no  
22                  one registered for public comments today.

1                   We now turn to the Smart Grid  
2 Subcommittee's White Paper on Electric  
3 Vehicles.

4                   Wanda?

5                   MEMBER REDER: Okay. I would like  
6 to thank the Subcommittee and all of those who  
7 put pen to paper and contributed comments  
8 along the way.

9                   This actually was an effort to  
10 look at the electric vehicle implications on  
11 the grid. Through the course of this, there  
12 was an effort to work on scope. The scope was  
13 focused on near- and mid-term, which is five  
14 to fifteen years. What was excluded is  
15 vehicle back to grid.

16                   A lot of discussion, of course, on  
17 cost allocations, implications on overloads,  
18 exceeding ratings, roaming, rates, cost  
19 allocation, security, that type of thing. So,  
20 the nature of this White Paper is to try to  
21 surface those as well as provide DOE three  
22 succinct recommendations.

1           At this point, good, David's at  
2           the table. David Anderson is actually with  
3           DOE in the vehicle technologies area and was  
4           invited to contribute at relatively the last  
5           minute.

6           So, what we would like to do,  
7           through this discussion, is make sure that we  
8           capture his comments, which are tracked on the  
9           document that is projected. I would like to  
10          turn it over to David, and you can just talk  
11          through your perspective, and from there, we  
12          will open it up.

13                 MR. ANDERSON: Okay. Thanks,  
14                 Wanda. And thanks for the opportunity to  
15                 provide some comments onto the paper.

16                 You know, the comments that I  
17                 inserted into the document were, as I have  
18                 told a few of you, were kind of meant as notes  
19                 to myself for talking points to lead into a  
20                 followup phone conversation with David. But,  
21                 as those of us who work at DOE know, most of  
22                 our days we don't get to work on what we plan

1 to work on. You are usually addressing  
2 higher-priority interrupts from various levels  
3 of the leadership. So, we didn't get to have  
4 that phone conversation. And so, I just  
5 decided to email him the document with the  
6 comments that I had put in there.

7 So, that is just kind of the  
8 context for the comments that I think have  
9 been distributed to you guys.

10 A couple of general comments, I  
11 guess, first. I have a horrible memory. So,  
12 I have to take a lot of notes whenever I do  
13 anything, and I took a lot of notes yesterday  
14 and it has been really interesting.

15 As a car guy, I tend to focus on  
16 the vehicle and up to the plug, and anything  
17 that happens on the grid side of the plug is  
18 often seen as a black box to folks in our  
19 office. And so, it is good to be able to  
20 think about what goes on outside the vehicle.

21 So, I learned a lot. I made a few  
22 notes. One thing that stuck out in my head

1 yesterday was I think Mike mentioned that  
2 approximately 350 billion kilowatt hours are  
3 wasted on the grid each year just in the  
4 transmission and distribution system. It  
5 takes a lot of power to move a lot of energy  
6 around. And so, I was thinking, well, 350  
7 billion kilowatt hours, what is that?

8 To put in a car context, if you  
9 assume a car can travel about three miles on  
10 a kilowatt hour of energy, and that is a  
11 conservative estimate -- it is probably closer  
12 to four, but let's just say three miles per  
13 kilowatt hour -- that is about a trillion EV  
14 miles that are represented from that 350  
15 billion kilowatt hours.

16 And a trillion is still kind of a  
17 number that is hard to get your head around.  
18 If you assume 15,000 miles per year that an  
19 average vehicle travels, that is about 70  
20 million vehicles, as opposed to the 1 million  
21 plug-in vehicles that the Administration has  
22 as a goal for 2015.

1                   Now that is about 25 percent of  
2                   our vehicle fleet in the U.S., about 250  
3                   million light-duty vehicles. So, that just  
4                   kind of puts it into perspective.

5                   The impact, when you are thinking  
6                   about the impact on the grid of electric  
7                   vehicles, at least from an energy supply  
8                   standpoint, it is much less significant than  
9                   the small percentage of inefficiencies in  
10                  moving power around the grid.

11                  A couple of other notes from  
12                  yesterday. There was a lot of discussion  
13                  about codes and standards, standards  
14                  specifically. That actually comes into the  
15                  paper as well. So, I will comment on that as  
16                  we go through the paper.

17                  And I guess I will stop there as  
18                  far as comments from the discussion yesterday.  
19                  I can talk for a long time about vehicles, and  
20                  I don't want to keep you guys here too long.

21                  So, looking at the paper, I  
22                  enjoyed reading the paper. Again, we focused

1 on the technology in my office more than the  
2 policy, but certainly the technology informs  
3 the policy. And so, I think the paper, it was  
4 a very interesting read and very consistent  
5 with the thoughts that we have in the Vehicle  
6 Technologies Program.

7 Our program is about \$300-million-  
8 a-year program, about half of which is devoted  
9 to vehicle electrification. We also manage  
10 about \$2.8 billion in Recovery Act projects,  
11 nearly all of which is related somehow to  
12 vehicle electrification.

13 And so, it is a high priority of  
14 the Administration, and it supports the goal  
15 of a million plug-in vehicles by 2015. I  
16 think I said that, but I am obligated to say  
17 that anytime I speak.

18 The first comment here is just on  
19 the range of 1 to 6 kilowatts that a vehicle  
20 might have, represent as a load on the grid.  
21 And that is certainly correct. You can plug  
22 a vehicle into a wall socket, basically, Level

1 1 charging. That is about 1.5 kilowatts. AC  
2 Level 2 charging goes up to almost 20  
3 kilowatts, but the truth is all of the  
4 hardware that is being deployed is only  
5 capable of up to about 7.2 kilowatts.

6 But that doesn't even matter  
7 because the vehicles that are being deployed  
8 are really on capable right now of about 3.3  
9 kilowatts, with a few upcoming vehicles  
10 capable of 6.6.

11 But there is DC fast-charging  
12 infrastructure being deployed, and that is 50  
13 kilowatts. That is where your big,  
14 instantaneous loads can come into play, and  
15 standards are being developed to kind of  
16 define fast-charging at up to 100 kilowatts.  
17 So, these fast-charging components will  
18 certainly not be at the residential level.  
19 They will be at industrial, commercial-type  
20 facilities, but that is just to add some  
21 commentary about the range of 1 to 6 kilowatts  
22 that vehicles could represent.

1                   And I should note that a lot of  
2                   the DC fast-charging, the higher level, 50  
3                   kilowatts to 100 kilowatts, those are being  
4                   implemented along in some cases with renewable  
5                   generation, solar panels, or with in-ground  
6                   energy storage, large batteries, to kind of  
7                   mitigate some of the effects of having such a  
8                   large load, mitigate those effects on the grid  
9                   by using the in-ground storage rather than  
10                  grid energy.

11                  MEMBER REDER: David, are you  
12                  suggesting that we add a comment on the DC  
13                  fast-charging and that we will see it in this  
14                  near- to mid-term?

15                  MR. ANDERSON: Yes, I think that  
16                  is a good idea. There is currently DC fast-  
17                  charging infrastructure on the ground that is  
18                  in use. So, we can see it today, certainly  
19                  not in nearly the numbers that we will see,  
20                  you know, the standard approximately 6  
21                  kilowatts charging, but it is there and will  
22                  grow in the near-term, if you define near-term

1 as five years.

2 As I am not a Committee member, I  
3 don't want to provide language for the  
4 document, but I will certainly provide input.

5 This is another comment that  
6 probably doesn't require any additions to the  
7 document. The sentence that spans from the  
8 first page to the second, you know, talks  
9 about vehicle-to-grid technology. As you  
10 mentioned, Wanda, that is not really covered  
11 in this paper because it is not really seen as  
12 near-term. And that is consistent with our  
13 thinking in the Vehicle Technologies Program.

14 There are some demonstration  
15 projects going on, but in the immediate-term,  
16 vehicle to grid is kind of a farther-reaching  
17 technology, basically due to concerns of the  
18 auto OEMs, the battery being such a critical  
19 component to the powertrain, they are  
20 reluctant to warranty batteries that might be  
21 exposed to any cycles not used for moving the  
22 vehicle around.

1 I think I have another comment  
2 here on the bottom of page 2. Actually, it  
3 was a question. The statement was made that  
4 EVs are likely to remain significantly more  
5 expensive in terms of purchase price, but much  
6 less expensive on a cost-per-mile basis as  
7 compared to conventional motor vehicles.

8 So, my question was, does the cost  
9 per mile only consider operating cost or is it  
10 also the amortized capital cost of the  
11 vehicle? Right now, most of our analyses in  
12 the office basically state that it is still  
13 not cost-competitive if you wrap in the  
14 capital costs. Certainly, the operating costs  
15 are much lower for a plug-in vehicle than for  
16 a conventional vehicle. But if you wrap in  
17 the capital cost, just due to the price  
18 premium that you have to pay, mostly due to  
19 the energy storage system, the battery --

20 MEMBER DELGADO: What we meant  
21 here was the actual charging cost because we  
22 are trying to compare behavior.

1 MR. ANDERSON: Okay.

2 MEMBER DELGADO: Really, you pay  
3 for the car in --

4 MR. ANDERSON: Right. Yes, so  
5 there is a price premium for the car, but  
6 certainly, yes, the operating cost --

7 MEMBER DELGADO: The per-mile  
8 expense of the car, without using the capital,  
9 which you are really saying, is the question  
10 we are talking about. Being so cheap drive  
11 performance. You can double up the cost of  
12 electricity and it won't make a difference --

13 MR. ANDERSON: Right, right.

14 MEMBER DELGADO: -- to the buyer.  
15 Or you can quadruple it, and it is still  
16 trivial compared with --

17 MR. ANDERSON: Right.

18 MEMBER DELGADO: -- what would  
19 happen if you got a diesel truck.

20 MR. ANDERSON: Right. Exactly.  
21 And, obviously, your assumptions with regard  
22 to electricity cost and fuel cost change the

1 equation, electricity cost not so much. You  
2 know, fuel costs are really highly uncertain.

3           Going forward, we tend to believe,  
4 as battery costs come down, as fuel price  
5 becomes more volatile, the equation will shift  
6 even more favorably to plug-in vehicles.

7           So, I guess my comment there was  
8 to make it clear that we are talking about,  
9 you know, the real thrust is that operating  
10 expenses are much less or operating costs are  
11 much less for the plug-in vehicles.

12           MEMBER WEEDALL: Mike, can I jump  
13 in here? I just have to respond.

14           I would just say I just can't  
15 agree with that statement. Look, we have  
16 bought the Leaf, and after the tax credit, it  
17 is \$25,000. So, the idea that all vehicles  
18 are more expensive -- even if you take your  
19 statement and I amortize the full capital  
20 cost, it is still much cheaper than the '97  
21 Camry that we just gave to our son to drive on  
22 a per-mile basis.

1                   So, I just think the whole  
2 statement of all vehicles are going to be much  
3 more expensive is a little strong for at least  
4 the personal experience I have had.

5                   MR. ANDERSON: Right, I would  
6 agree with that statement. Which part of my  
7 statement would you disagreeing with because  
8 I think we are consistent?

9                   MEMBER WEEDALL: I guess I am  
10 responding to the statement that is in the  
11 paper, you know, that all vehicles are more  
12 expensive.

13                   MR. ANDERSON: Oh, okay.

14                   MEMBER WEEDALL: Or it is going to  
15 be more expensive for a long time. Because,  
16 once again, it didn't work out that way for  
17 me.

18                   MR. ANDERSON: That wasn't your  
19 experience with the Leaf. I appreciate that  
20 comment.

21                   So, your Leaf there that was  
22 \$32,000 before the tax credit, I mean, there

1 is the tax credit. So, I am not sure if the  
2 paper is considering federal and even state  
3 and local-level incentives.

4 But the \$32,000 I would say is  
5 expensive for a vehicle of the class that the  
6 Leaf is. The \$25,000, even after the tax  
7 credit, if that were a conventional vehicle,  
8 it would be a \$15,000 to \$17,000 vehicle. So,  
9 there is still an \$8,000 to \$10,000 premium  
10 there.

11 MEMBER REDER: We are probably  
12 getting in the weeds a little bit.

13 Roger?

14 MEMBER DUNCAN: This is too  
15 complicated. I think if you leave the  
16 statement as you originally had it, that the  
17 operating costs are certainly cheaper.

18 MEMBER REDER: Yes.

19 MEMBER DUNCAN: No one disagrees  
20 with that statement. The Leaf maybe. The  
21 Tesla, on the other hand, you know --

22 (Laughter.)

1                   MEMBER REDER: So, what I am  
2 hearing is purchase price, but much less  
3 operating cost on a per-mile basis?

4                   MR. ANDERSON: Yes, and I don't  
5 even think we need to get -- yes, we will  
6 leave it there.

7                   MEMBER REDER: That's it? Okay.

8                   Moving on.

9                   MR. ANDERSON: All right.  
10 Apologies.

11                   Okay. So, on page 3, the second  
12 paragraph from the top I didn't comment on in  
13 the paper, but it gives several examples of  
14 studies that talk about the number of EVs that  
15 could be accommodated by the grid. And they  
16 all have the assumption that the vehicles are  
17 not charged during peak periods.

18                   My comment there is that, yes,  
19 smart charging is critical in order to  
20 accommodate a large number of plug-in vehicles  
21 on the grid. Probably no need for changes in  
22 the document there.

1           The comment that I did add, let's  
2 see, what is this comment? The biggest impact  
3 on the electric power system in the medium-  
4 term of widespread EV deployments is likely to  
5 be at the electric distribution level. Yes,  
6 again, that is consistent with our thinking.

7           If purchases of hybrid electric  
8 vehicles are any indication, we are going to  
9 see plug-in electric vehicles clustered.

10          People that have bought hybrid electric  
11 vehicles often live in the same neighborhoods.  
12 You know, your neighbor buys a Leaf, and you  
13 have to go buy a Leaf to show how green you  
14 are.

15          And so, even before we get a huge  
16 penetration level of plug-in vehicles, there  
17 may be some impacts at the local distribution  
18 node level, simply due to the fact that we  
19 have that clustering.

20          And even if we are not overloading  
21 transformers, my understanding is that  
22 transformers are designed to kind of heat up

1 during the day and cool off overnight. And if  
2 people are charging in off-peak times, i.e.,  
3 overnight, and the transformer does not get a  
4 chance to cool off, it could shorten the life,  
5 as I understood it. Not being a grid guy, I  
6 am just reiterating anecdotes.

7 MEMBER REDER: There are folks who  
8 want to add comments in here. I think what we  
9 are going to do, David, is go through your  
10 comments.

11 MR. ANDERSON: Okay.

12 MEMBER REDER: And then we will  
13 take official edits for the document from the  
14 Committee.

15 MR. ANDERSON: Okay.

16 MEMBER REDER: So, go ahead.

17 MR. ANDERSON: Okay. I thought I  
18 saw a hand up.

19 The comment that I wrote on the  
20 top of page 4 that wasn't shared, and it was  
21 just kind of a thought, as I have listened to  
22 the discussion here, is, in my mind, it is OE,

1 the Office of Electricity. It is kind of  
2 their charge to understand what the impact on  
3 the grid is of electric vehicles, but they  
4 can't do that without our office, the Vehicle  
5 Technologies Program.

6 It is our job to work with the  
7 Office of Electricity to let them know what  
8 the likely load will be. Of course, modeling  
9 consumer behavior is often an exercise in  
10 frustration.

11 But the point being that, as in  
12 any large organization, we often work in  
13 silos, and there has to be some collaboration  
14 between Vehicle Technologies and the Office of  
15 Electricity to kind of solve the problem of  
16 what the overall impacts are going to be.

17 The comment there in pink on the  
18 sentence, "the notification process to inform  
19 utilities where EVs will be charged," et  
20 cetera, you know, we are doing a lot of  
21 deployment projects, EVSE.

22 And I apologize if I haven't

1 defined EVSE. EVSE is Electric Vehicle Supply  
2 Equipment, also generally know as electric  
3 vehicle charger.

4 Anytime an EVSE is installed, it  
5 typically involves the pulling of a permit  
6 from the local jurisdiction. In a lot of  
7 cases, in our deployment projects we are  
8 trying to install the mechanism whereby the  
9 permitting authority can notify the utility  
10 when a permit is pulled, so that the utility  
11 is aware that an EVSE is going in. That might  
12 be easier said than done, just given the  
13 number of utilities around the country and the  
14 fact that there are 44,000-some-odd  
15 municipalities issuing permits. But simply a  
16 suggestion for how that notification process  
17 could be implemented.

18 The second comment on page 4, I  
19 highlighted the word "residences". I think  
20 the overall assumption is that most vehicles  
21 will be charged at home or wherever the  
22 vehicle is kept overnight. And so, just

1 again, highlighting residences there.

2           There is often a pyramid shown in  
3 a lot of presentations I have seen where the  
4 bottom of the pyramid is residents, the middle  
5 of the pyramid is the workplace, and the top  
6 of the pyramid, being the smallest piece, is  
7 public charging, to sort of represent where  
8 the charging events will occur.

9           On page 5, yes, the information  
10 there, I just wanted to note this goes to  
11 understand how consumers are using the  
12 vehicles, how they are utilizing the charging  
13 infrastructure.

14           Again, through some of our  
15 Recovery Act projects, we are deploying about  
16 20,000 EVSEs around the country, supporting  
17 about 13,000 electric vehicles or plug-in  
18 vehicles, kind of concentrated in major  
19 municipal areas.

20           And we are collecting data from  
21 all of this infrastructure to kind of  
22 understand how it is being used, collecting

1 data like max power pulled from each EVSE,  
2 what the average 15-minute rolling power is,  
3 the total power delivered. And this  
4 information is being collected and analyzed  
5 and published.

6 So, over the next three years, it  
7 will be the largest collection of information  
8 I think available on how consumers use their  
9 vehicles and their plug-in infrastructure.  
10 And I think that will go a long way to inform  
11 the decisions of what the impacts on the grid  
12 are going to be.

13 The second comment on that page,  
14 anticipating how consumer EV charge behavior  
15 might change in response to pricing signals,  
16 San Diego is one of the cities in which we are  
17 deploying vehicles and chargers. That is  
18 through a project with ECotality North  
19 America. They are working with San Diego Gas  
20 and Electric to actually implement time-of-use  
21 pricing, and through the course of the  
22 project, analyze and understand how that time-

1 of-use pricing scheme affects consumer  
2 behavior when they charge their vehicles.

3 A comment that I didn't put on  
4 here, in the middle of the last paragraph on  
5 page 5, the sentence, "Consumer demand is only  
6 marginally impacted by motor fuel prices" is  
7 how the sentence begins. That is true in the  
8 short-term, but I think in the long-term there  
9 is a lot more price elasticity in there.

10 You see over time with elevated  
11 fuel prices consumers tend to purchase a lot  
12 more fuel-efficient vehicles. They can't  
13 really react in the short-term. You don't buy  
14 a new vehicle every time the price of gas  
15 changes, but in the long-term purchasing  
16 habits can be shaped.

17 On page 6, I think the comment  
18 that I had inserted there is related to  
19 standards, my comment being "DOE is actively  
20 engaged in the codes and standards arena  
21 through participation in standards-development  
22 organizations, in coordination with the auto

1 manufacturers, EVSE manufacturers, and other  
2 stakeholders."

3 I also mentioned the U.S.  
4 Drive Partnership, which is our partnership  
5 with the automotive manufacturers and energy  
6 companies. It has a number of technical teams  
7 in it. One particular technical team is the  
8 Grid Interaction Technical Team, which their  
9 sole focus is the support of standards  
10 development covering the interface between  
11 electric vehicles and the grid.

12 I guess one comment, additional  
13 comment, there is that we talked a lot about  
14 standards yesterday. In the U.S., at least as  
15 far as vehicles are concerned, standards is  
16 kind of a voluntary process. I have heard the  
17 comment that standards are great; there are so  
18 many to choose from. And it is really up to  
19 the industry to adopt the standards that they  
20 feel are appropriate.

21 We are certainly involved in the  
22 development of standards by offering technical

1 support to the standards development  
2 organization, most specifically, SAE, the  
3 Society of Automotive Engineers. Again, we  
4 are not trying to promote a specific standard,  
5 but promote the development of suitable  
6 standards by providing technical input and  
7 expertise.

8 MEMBER REDER: We are kind of  
9 running through some time here.

10 MR. ANDERSON: Okay.

11 MEMBER REDER: So, if we could  
12 make this --

13 MR. ANDERSON: Speed it up?

14 MEMBER REDER: Yes.

15 MR. ANDERSON: All right. Page 8,  
16 again, I entered the comment there regarding  
17 our deployment projects. I won't talk about  
18 that again.

19 A comment that I didn't have  
20 there, there is a footnote at the bottom,  
21 footnote No. 8, that says "fast-charge, also  
22 known as Level 3 charging." Traditionally,

1 that is known as Level 3 charging, but it is  
2 incorrectly known as Level 3 charging. SAE is  
3 further defining their nomenclature, and fast-  
4 charging is more accurately referred to as DC  
5 Level 2 charging. So, I would recommend a  
6 change there.

7 Level 2 charging is more  
8 specifically known as AC Level 2. Most all of  
9 the infrastructure that is going in is of the  
10 AC Level 2 variety.

11 DC fast-charging, formerly  
12 commonly-known as Level 3, is more  
13 specifically DC Level 2, yes.

14 Page 9, I guess the wrap-up  
15 comments would be the three EAC  
16 recommendations, the first recommendation  
17 states that "DOE should provide state utility  
18 regulators and stakeholders information."  
19 Again, we are collecting this information  
20 through our Recovery Act deployment projects.  
21 It is made available to the public, and over  
22 the next three years there is going to be a

1 lot more information coming out.

2           The second recommendation, "DOE  
3 should analyze the impacts that EV deployment  
4 may have on the electric power system and make  
5 recommendations." Again, I think it is the  
6 responsibility, at least within DOE, of the  
7 Vehicle Technologies Program to support the  
8 Office of Electricity in doing this. And so,  
9 we again need to kind of break down those  
10 silos.

11           And finally, the third point there  
12 on standards, the word "promoting", "DOE  
13 should, to the extent that it is needed,  
14 consider promoting...." I am glad the word  
15 "promoting" is there rather than "issuing"  
16 standards, because that is what we are doing.  
17 We are certainly promoting standards and  
18 promoting the development of standards, not  
19 picking winners and losers.

20           I have a few other minor comments,  
21 but I will leave it at that, in the interest  
22 of time.

1 MEMBER REDER: Okay. Very good.

2 With that, we will open it up for  
3 discussion. If you have specific language,  
4 now is the time.

5 Roger?

6 MEMBER DUNCAN: Well, I want to  
7 apologize first. I scheduled two calls with  
8 the Committee on this, and I had household  
9 emergencies at both times that prevented me.  
10 So, I am sorry my comments are coming in late.  
11 But I do have a few.

12 First of all, on the general  
13 charging discussion, almost all the charging  
14 that we are seeing now is occurring at the  
15 residences. I mean, that pyramid probably is  
16 misshapen. There is hardly any use of the  
17 public charging stations, I think, that we are  
18 seeing at all.

19 And furthermore, the fast-charging  
20 is really not necessary in the residential.  
21 My Chevy Volt that I have had for 10 months  
22 now, I have an old 120 in the garage that

1 works just fine.

2 I think the real bottleneck is  
3 occurring, though, because of the lack of  
4 charging for people in condos and apartments.  
5 There is a residential charging bottleneck for  
6 people who don't have garages, and they are  
7 not using the public charging stations and  
8 they don't have a garage. And some of them  
9 are trying to charge at the office. But that  
10 is the bottleneck, and it leads to other  
11 issues.

12 You also have in here later the  
13 idea of community energy storage being  
14 combined with public infrastructure that you  
15 mention to offset that load. I think the need  
16 may be more complicated than that.

17 There is probably going to emerge  
18 a need for community energy storage at the  
19 residential level, which is going to be much  
20 more difficult to site as a smoothing  
21 activity. It is easier for fleets that have  
22 their own facilities in a lot facilities.

1                   But I think you may see this break  
2 down into residential charging, fleet  
3 charging, and public stations. And everyone  
4 is putting so much emphasis on the public  
5 charging infrastructure. And I think groups  
6 like ECotality and such are having tremendous  
7 problems locating those stations now.

8                   So, that is one comment. I think  
9 that is where the real bottleneck may occur.

10                   MEMBER REDER: Do you have some  
11 specific language to propose?

12                   MEMBER DUNCAN: I don't, but I can  
13 send you something, if we can't do it right  
14 away.

15                   MEMBER REDER: What we would like  
16 to do today is get this over the finish line.

17                   MEMBER DUNCAN: Is finish, get  
18 done.

19                   MEMBER REDER: Yes. So, if you  
20 wouldn't mind, draft up something. That would  
21 be helpful.

22                   MEMBER DUNCAN: I will try to do

1 that.

2 The second thing is just a  
3 comment. You mention in there that there may  
4 be a policy issue with people paying, being  
5 reluctant to pay for other people's electric  
6 infrastructure. I will just comment that I  
7 doubt this is going to happen because I don't  
8 think that the circuit-level distribution  
9 system upgrades are going to be enormous  
10 enough to trigger rate increases on the local  
11 level. They are going to be somewhat  
12 distributed, even though they will be mainly  
13 focused in Prius neighborhoods, as we call  
14 them.

15 But you don't have new substations  
16 now going into expanded neighborhoods, being  
17 resisted by the neighborhoods that are not  
18 having the new substations. I just sort of  
19 doubt personally that that would emerge as an  
20 issue.

21 And then, the final somewhat of an  
22 anecdotal comment is I think you we will

1 probably see the major test case of this next  
2 summer in the Pecan Street Project. You list  
3 the projects here.

4 This has come about since you  
5 started this paper, but by next summer we have  
6 one neighborhood in Austin on Pecan Street  
7 where we will have 150 to 200 homes that will  
8 have solar on them. They already have 176.  
9 GM has arranged to put 100 to 150 Volts into  
10 the same neighborhood. And the average August  
11 temperature this summer was 103 degrees in  
12 that neighborhood. So, we are going to see if  
13 the transformers smoke when all that combines  
14 next summer.

15 So, I don't have any other changes  
16 to the recommendations. I will see if I can  
17 work on a one-sentence change on the charging.

18 MEMBER REDER: Excellent. Thank  
19 you.

20 Sonny, go ahead.

21 MEMBER POPOWSKY: Yes, and let me  
22 apologize because I may have to leave early to

1 get back to Harrisburg for another engagement.

2           The two points raised by Dave that  
3 I think that we really ought to address with  
4 just a paragraph perhaps are his comments D3  
5 and D5. I think what Dave is saying here, and  
6 I agree with him, and I don't think we  
7 captured it in the draft, is that most  
8 residential charging will be done at night  
9 overnight.

10           We focused in our paragraphs on  
11 page 3 on the problem of fast-charging, the  
12 half-hour charge. And I think we should  
13 include Dave's points 3 and 5, which is that  
14 most of it will occur overnight in residences.  
15 But even that could cause problems because of  
16 the cooling-down factor. So, we shouldn't  
17 think we are home-free just because most of it  
18 is occurring at night.

19           The other point I would add is  
20 that, if people just come home, I think they  
21 are likely to come home at five o'clock and  
22 plug in and just leave it. And five o'clock

1 is right at your winter peak. So, I think  
2 that is what most people are going to do.

3 So, even if it is not fast-  
4 charging, the overnight charging, especially  
5 if you just come home right at the winter  
6 peak, five o'clock, and plug in until the next  
7 morning, that is a problem.

8 The other, which I apologize, I  
9 raised in an email last week, if I could. We  
10 added a paragraph, the Subcommittee, at the  
11 very end, on page 6, and it is paragraph  
12 capital "B".

13 And I am sorry that Guido is not  
14 here because this was an issue we discussed.

15 The way this is phrased is the  
16 concern is what he called EV roaming and how  
17 to get regulators to figure out how to  
18 allocate costs among service territories. I  
19 think that would only be a problem if the  
20 customer is the car or the driver. But the  
21 customer, I think, is the charging station.

22 If you are at home, the bill will

1 go to you at your home because you have the  
2 charging station. If you are at the Westin  
3 Hotel here, the bill will go to the Westin  
4 Hotel from PEPCO or Dominion, or whoever.  
5 They will send a bill to the hotel. They  
6 don't have to worry about the fact that I  
7 drove my car from Pennsylvania to Virginia.

8 So, I would actually -- I hate to  
9 say it -- delete that paragraph. At least  
10 that is my view, that that is not a problem.  
11 If the customer is the entity that is  
12 providing the charging, the electric company  
13 charges the hotel. The hotel then charges me  
14 the same way they charge me for watching a  
15 movie on the cable.

16 So, I think that is the way it is  
17 going to work. I don't think that the way we  
18 put it in this paragraph is the way it is  
19 going to work. So, I would delete that.

20 MEMBER VAN WELIE: I would agree  
21 with Sonny. I think it is going to be like  
22 internet service.

1 MR. ANDERSON: Yes, I will echo  
2 that agreement. A lot of the business models  
3 that we are seeing form around charging, there  
4 are various service models. Without going  
5 into details, yes, that is the way --

6 MEMBER ROBERTS: I am involved in  
7 a project to roll out a million charging  
8 stations in hotels. They are convinced it is  
9 going to follow the same internet charge. It  
10 is going to be free, and it is going to be an  
11 attraction to stay in the hotel. The hotel  
12 owner will pick up the cost.

13 MEMBER HEYECK: That is my single  
14 comment, to drop this section, because I don't  
15 really believe that this section is really  
16 going to be that big a problem.

17 MEMBER REDER: All right. Is  
18 there any objection to dropping this  
19 paragraph?

20 (No response.)

21 Hearing none, it's gone.

22 MEMBER ROBERTS: Which?

1                   MEMBER REDER: The EV roaming  
2 first paragraph, the whole section, I guess.

3                   MEMBER ROBERTS: This whole  
4 section?

5                   MEMBER REDER: Yes.  
6 Rich?

7                   CHAIR COWART: Yes, I have one  
8 comment to add a positive note to this paper.  
9 It is mostly I like the paper, and it is  
10 mostly focused on challenges.

11                   I want to add to it something that  
12 we have talked about in the Committee, but it  
13 is just not here. That is, on the positive  
14 side, electric vehicles offer the opportunity  
15 of significant new managed load that can to  
16 help balance variable renewables on the grid.

17                   And I have a sentence for that in  
18 the text and also in the recommendation. I  
19 would just add a sentence on top of page 3 in  
20 the background section. This could go pretty  
21 much anywhere, but I was looking for the place  
22 where it flows.

1                    "These challenges will be  
2                    inconsequential in 2011, but could become  
3                    quite significant as deployment of EVs  
4                    increases." Right after that, "On the  
5                    positive side, EVs offer an important new  
6                    opportunity to link variable renewable  
7                    generation to managed charging systems and  
8                    rate designs, helping to balance generation  
9                    and load." Very simple.

10                    MEMBER REDER: All right. Any  
11                    objections to that addition?

12                    MEMBER CAVANAGH: Yes, I think so.  
13                    Why are we linking a generation source and a  
14                    load source? We balance aggregate, generation  
15                    and --

16                    CHAIR COWART: Yes, that's what I  
17                    mean.

18                    MEMBER CAVANAGH: Okay. Can we  
19                    take out the word "link"? You said "link"  
20                    variable resources to this load source.

21                    CHAIR COWART: An opportunity to  
22                    -- I am thinking of a generic --

1                   MEMBER CAVANAGH: "Assist with  
2 power system balancing"?

3                   CHAIR COWART: Well, I want to be  
4 more specific. I want to specifically mention  
5 variable renewable generation as a challenge  
6 to the system that --

7                   MEMBER CAVANAGH: I guess one  
8 person's positive is another person's  
9 negative.

10                  CHAIR COWART: I understand, but  
11 there is a win/win situation here. This is  
12 actually a point which is worth consideration  
13 for the Committee's thinking about integration  
14 of renewables generally.

15                  That is, in order to accept a high  
16 degree of penetration of variable renewable  
17 generation, we are going to need more managed  
18 load. And this is one of the major, new  
19 sources of managed load.

20                  So, I agree that we don't need to  
21 link a particular solar farm to my car. But,  
22 as a grid management and grid planning policy,

1 thinking about doing these things in tandem to  
2 me makes a lot of sense.

3 MEMBER VAN WELIE: Could I offer a  
4 suggestion which might close the gap here? If  
5 you, in the first instance, make the point  
6 that we will need additional balancing  
7 resources, and then you can say "and electric  
8 vehicle charges" or charging could be one of  
9 the resources to provide that service.

10 Does that solve your issue?

11 MEMBER CAVANAGH: Yes, that's  
12 good.

13 CHAIR COWART: I thought I had  
14 satisfied you by moving away from the word  
15 "intermittent" to "variable".

16 (Laughter.)

17 But, apparently, we just have to  
18 go the next step.

19 Please understand that the policy  
20 objective is one that you would support.

21 MEMBER REDER: So, Rich, you have  
22 a sentence drafted, something along the lines,

1 "In recognition of needing additional  
2 balancing resources....," something or another?

3 CHAIR COWART: Something like  
4 that.

5 MEMBER REDER: All right.

6 CHAIR COWART: I will work on  
7 those words.

8 And then, the positive note,  
9 again, at the end in the recommendations,  
10 Point 3, "DOE should study the most effective  
11 methods" -- I am working off of Sonny's edits  
12 here -- "of minimizing any negative impacts."  
13 And I would say, "and maximizing the positive  
14 contributions of EV deployment".

15 And, Rob, that is neutral-enough  
16 for you, I think.

17 MR. ANDERSON: Not to belabor a  
18 point, I sort of agree with at least the  
19 sentiment of linking, if not the word. I  
20 mean, we have looked at studies to link  
21 nighttime wind generation with nighttime  
22 charging. And just the fact that a lot of the

1 wind generation occurs during nighttime, there  
2 are synergies with EV charging.

3 MEMBER REDER: Okay. Other  
4 comments? Gordon?

5 MEMBER VAN WELIE: I was just  
6 going to say, on that point, though, I think  
7 you could tee it up a different way, which is  
8 the likelihood is, if we have a lot of  
9 renewable generation on the system -- and I  
10 think this is playing out in Europe already --  
11 that you have wasted all that energy. You are  
12 basically having to spill the energy. And so,  
13 the opportunity is not to do that and have it  
14 actually be stored in vehicles to be used the  
15 next day.

16 MEMBER DELGADO: Yes, these  
17 comments can become complicated. You know,  
18 you are going to need about three more pages  
19 in the paper.

20 (Laughter.)

21 I would suggest that there are  
22 positives to the car that have positive

1 impacts on load at night.

2 MEMBER REDER: Rich, a suggestion  
3 here. I know we are pushing on break.

4 I can summarize the things that I  
5 heard as comments, and during break maybe we  
6 propose language and flash it up, and then  
7 make sure that everybody is in agreement after  
8 break.

9 Would you be --

10 CHAIR COWART: If we can  
11 accomplish that, that's terrific. If not --

12 MEMBER REDER: And if not, we will  
13 carry it on later.

14 CHAIR COWART: Right.

15 MEMBER REDER: All right. So,  
16 what I heard, that there is language being  
17 drafted around the table along the lines of  
18 Roger said that, you know, there are  
19 implications around condos in residential.  
20 Sonny said, relative to Dave's comments, he  
21 was in agreement with proposal D3 and D5.  
22 Also, we needed some language around the

1 overnight charging and the implications to the  
2 lack of diversity of load on equipment. And,  
3 of course, we just went through Rich's  
4 comments in recognition of balancing  
5 resources. And then, there was a comment  
6 towards the end on recognition of the positive  
7 contributions of EV.

8 One other comment up here. Sorry.  
9 Brian?

10 MEMBER WYNNE: Yes, quite  
11 possibly, the only topic the entire year that  
12 I know something about. And I have had to  
13 really kind of narrow it down. I think there  
14 have been some really great comments.

15 The piece that is missing to me --  
16 and, Dave, you kind of pointed at the silos --  
17 is there is no discussion here of the role  
18 that automobile companies are playing in this,  
19 on the demand side of this.

20 And this comment kind of reminded  
21 me -- how many people are plugging in their  
22 cars right now besides Mike and I and Roger?

1                   Okay. You know, my Volt, like  
2 Roger's Volt, when we shut it off, it gives us  
3 an option. You can charge immediately or you  
4 can defer it. Also, there is a third option.  
5 You can set the time. I need a full charge by  
6 such-and-such a time.

7                   So, that is the default for me, is  
8 I have mine set to give me a full charge by  
9 six o'clock in the morning. I have no idea  
10 when it charges. I would literally have to  
11 sit out there all night to watch, you know,  
12 wait for it to go solid green and start  
13 charging.

14                  Your point, Gordon, about energy  
15 being spilled. Wind energy price is going  
16 negative in Texas. So, the automobile  
17 companies have a role to play in that, is my  
18 point, in designing the technology. Because  
19 most consumers are not going to look up the  
20 third option, by the way, is deferred  
21 charging, you know, best price, something like  
22 that. It is an algorithm, basically.

1                   And if I put it on that, I haven't  
2                   loaded when the best prices are because it is  
3                   Dominion, and I don't think there is a  
4                   difference.

5                   But I would have to actually do  
6                   some research to figure out when is the right  
7                   time for me to do that. But, at the end of  
8                   the day, what I do, I have it set, default to  
9                   basically just charge by a certain time in the  
10                  morning.

11                  My point simply is on the positive  
12                  side of this is designing the cars in such a  
13                  way, and the automobile manufacturers are  
14                  really focused on this, to encourage, give the  
15                  consumer an option. Make that option  
16                  available to charge at night.

17                  It also has charge immediately,  
18                  and I do that when I get to the office. You  
19                  know, when I pop the little door, it says, "Do  
20                  you want to charge immediately?" because you  
21                  are set to defer. And I hit "Yes", and I  
22                  charge with a 110 at the office.

1                   So, the role of the automobile  
2                   companies in designing the cars so that there  
3                   is an interface in the car that reminds the  
4                   consumer, that gives the consumer the option  
5                   to charge at a time that is more convenient  
6                   for the grid, when there is more energy  
7                   available.

8                   I am not sure exactly how that  
9                   fits in. I am sort of struggling through the  
10                  document to figure out exactly where the most  
11                  positive place to put that in.

12                  But I think that is important,  
13                  that we marry up all the good work that is  
14                  being done by Dave and Pat Davis' group, so  
15                  that we don't cause problems as we build more  
16                  and more volume on the grid.

17                  MEMBER REDER: Are you suggesting  
18                  a fourth recommendation to encourage  
19                  coordination with the automobile industry?

20                  MEMBER WYNNE: Well, I think that  
21                  coordination is going on right now.

22                  MEMBER REDER: Yes.

1                   MEMBER WYNNE: But, yes, I think  
2                   that is essentially why I am almost hesitant  
3                   to say it because telling DOE that they need  
4                   to cooperate with the automobile industry is  
5                   redundant. I mean, you know, it is  
6                   essentially going on.

7                   I just wanted to make sure that  
8                   that positive element of it was carried  
9                   through --

10                  MEMBER REDER: Right.

11                  MEMBER WYNNE: -- and that it is  
12                  recognized as an opportunity.

13                  MR. ANDERSON: I would suggest  
14                  that a suitable place to add that might be in  
15                  the last paragraph on page 6. There is a  
16                  statement about, "It will be important for the  
17                  charge meter to have standardized  
18                  communication," et cetera, "display the  
19                  economic impact of the charge/discharge to the  
20                  consumer". And that is kind of where that  
21                  price signal comes in, Section C, bottom of  
22                  page 6, right in the middle of that paragraph.

1                   Now I had written off to the side  
2                   a note. Instead of displaying the economic  
3                   impact of the charge decision to the consumer  
4                   or just make a decision automatically. Like  
5                   Brian was saying, he sets his to charge, be  
6                   sure to be charged when he needs it, and there  
7                   is even an option to do it based on price.  
8                   So, maybe that could be expanded to kind of  
9                   accommodate that note.

10                   MEMBER REDER: Brian, do you find  
11                   that an acceptable insert?

12                   MEMBER WYNNE: Yes, absolutely. I  
13                   think that is exactly the right place.

14                   MEMBER REDER: Anything else?

15                   (No response.)

16                   All right, Rich, it is back to  
17                   you.

18                   I would just recommend that we get  
19                   the language back to the back of the table  
20                   over break, and then we will see where it  
21                   lands.

22                   CHAIR COWART: Okay. So, just

1 looking at the agenda here, we are scheduled  
2 for a break. And then, we could deliberate to  
3 see whether or not we can come up with  
4 language in the next 15 minutes, if we can  
5 summarize all this.

6 If we can't, this might be  
7 something that we could actually wordsmith and  
8 send around to the Committee and ask for an  
9 electronic vote, if we wanted to move this  
10 forward without waiting until the next  
11 meeting. So, I want to leave open that  
12 possibility because I think that may be what  
13 we end up with.

14 MEMBER REDER: Okay.

15 CHAIR COWART: And then, when we  
16 resume, we will just have kind of a quick  
17 discussion, wrap-up discussion, and a  
18 conversation about items that the Committee  
19 members would like us to have on the agenda  
20 for the 2012 work plan.

21 And I think that can be at this  
22 meeting a relatively short discussion. The

1 Subcommittee Chairs have already weighed-in on  
2 some of this.

3 And, David, do you have anything  
4 further?

5 MR. D. MEYER: Well, I would say  
6 to everyone that now is the time to put your  
7 suggestions forward about topics that come to  
8 mind to you as things that would be worthwhile  
9 to pursue. We have some ideas already that  
10 have occurred to various people, but I want to  
11 be sure that we make it very plain that the  
12 window is open and now is the time. I mean,  
13 the window is always open in a sense, but,  
14 still, it is especially timely now.

15 CHAIR COWART: Okay. We will try  
16 to reconvene at 3:00 and then have that  
17 discussion, that short discussion. We will  
18 probably adjourn a little bit early.

19 Thank you.

20 (Whereupon, the foregoing matter  
21 went off the record at 2:41 p.m. and went back  
22 on the record at 3:02 p.m.)

1 CHAIR COWART: All right, we are  
2 reconvened.

3 Mike?

4 MEMBER HEYECK: Just a process  
5 comment. The Subcommittees do a lot of work  
6 on these documents, a lot of redline changes.  
7 The problem is between the Subcommittee  
8 delivering to the full Committee there is very  
9 little time for the full Committee to consume.  
10 I just wanted to see in the future if we could  
11 lengthen that time to actually have some  
12 redline changes exchanged with the Committee,  
13 so that we could, frankly, avoid writing  
14 reports on the fly.

15 CHAIR COWART: So noted. It is an  
16 excellent recommendation, and it is not a good  
17 use of 20 or 25 people's time to sit here  
18 doing a lot of redlining. I absolutely agree  
19 with that.

20 Some of it will be deliberative  
21 and, therefore, essential to do in full  
22 Committee, but not the small change edits that

1 mostly we have been making.

2           So, a request to the Subcommittees  
3 on a forward-going basis will be to make sure  
4 that there is an opportunity for that kind of  
5 work in advance of full Committee meeting. It  
6 might be a hard discipline to impose on  
7 ourselves, but we probably should do that. It  
8 is a good recommendation.

9           So, in the next very few minutes,  
10 we should begin a conversation about next  
11 year's work plan. And I guess I should begin  
12 the conversation by -- everybody is not in the  
13 room at the moment -- by just pausing for a  
14 moment because Pat Hoffman needed to go to a  
15 meeting with the Secretary. She is not here  
16 to say this.

17           But to thank each and every member  
18 of the Committee for their work this year and  
19 their contributions to the deliberations of  
20 the Committee, to the mutual education of your  
21 colleagues and the Department. And I realize  
22 that every member of this Committee is busy,

1 experienced, knowledgeable. It is a terrific  
2 collection of talent, and the Department, I  
3 know, really appreciates your service. And I  
4 just wanted to make a note of that as we  
5 officially -- this is the last meeting for  
6 2011. I just needed to say that.

7 As I understand it, the terms of  
8 members of the Committee vary and they come up  
9 for reappointment or renewal. That means that  
10 we are going to be and the Department is going  
11 to be in the process of considering Committee  
12 members for next year.

13 And I guess here I will ask each  
14 of you to make recommendations. I think Peggy  
15 is probably at this point the person to talk  
16 to. Or is it you, David?

17 MR. D. MEYER: Either. Peggy and  
18 I talk pretty frequently, as you can imagine.

19 CHAIR COWART: Okay. So, if you  
20 have suggestions to sort of balance out the  
21 interests and expertise of members of the  
22 Committee going forward, please make those

1 recommendations known to Peggy and David.

2 And I think that is it on this. I  
3 actually don't know the process by which the  
4 Department makes those decisions, but I know  
5 that they are going to be discussing the  
6 Committee makeup for the next year.

7 Now, in terms of the work going  
8 forward, we have had a request from the  
9 Department for the Committee and the  
10 Subcommittees to be more proactively engaged  
11 on directly-relevant policy matters. We have  
12 also replied with a request back to the  
13 Department, and I am hearing this quite  
14 clearly from people in two ways.

15 The first is for more direct  
16 connection to senior staffers at the  
17 Department working on particular projects.  
18 And secondly, a request that the Department  
19 anticipate decisions that are actually in  
20 front of the Department on which they want  
21 precise input from the Committee.

22 And so, as opposed to just talking

1 about interesting policy issues, we really  
2 want to apply your talents and expertise to  
3 the decisions that the Department is facing,  
4 and on which our input is most directly  
5 relevant.

6 And this is, I think, a request  
7 and a discipline that has to be bilateral in  
8 terms of the Committee and the Department.  
9 So, I am stating that in part because I know  
10 it should be part of our conversations going  
11 forward with Pat and her staff, and, also, to  
12 let you know that I heard that from Committee  
13 members and recognize it as an important  
14 request from the Committee itself, that we  
15 focus on issues that the Department is really  
16 grappling with and where they want our input.

17 MR. D. MEYER: Let me be very  
18 explicit on one particular point here. That  
19 is, as we identify promising work topics, or  
20 as you identify promising work topics, before  
21 the Subcommittee invests substantial effort in  
22 research or writing a paper, or something like

1 that, the next step, once you have kind of  
2 begun to get a sense of, hey, this topic is  
3 pretty important and we should give it some  
4 attention, that is the time when there needs  
5 to be active dialog with the appropriate  
6 people in the Department.

7 So that, before you start  
8 investing a lot of your time, you have a sense  
9 of what is the landscape here within the  
10 Department? How is the Department thinking  
11 about this? What have they done? What have  
12 they not done?

13 That will mean that the subsequent  
14 work that you do will be of greatest relevance  
15 and value. And making that happen, as Rich  
16 has already made clear, I mean, there is a  
17 substantial responsibility on our side to  
18 facilitate that dialog, but we want to be sure  
19 you understand we are going to expect you to  
20 be very active in that dialog. So, yes.

21 CHAIR COWART: All right. Now in  
22 terms of brainstorming about topics that you

1 believe we should be paying attention to in  
2 the coming months, maybe we can just begin by  
3 putting ideas on the table. I think the  
4 Committee leadership and David and Pat will  
5 then try to turn that into an agenda. But, at  
6 the moment, it is just we are just  
7 brainstorming.

8 MEMBER HEYECK: I think we talked  
9 about this. It is really the next-generation  
10 EMS system to deal with the variability, to  
11 deal with microgrids coming in and out, to  
12 deal with storage, to deal with the many  
13 things that are going to be new to the system.

14 I know what EPRI is doing. I  
15 don't know what the Department is doing. But  
16 we should identify gaps in overall grid  
17 control.

18 MEMBER REDER: And I would add to  
19 that the location of the intelligence. So, to  
20 the extent that it is layered or distribution,  
21 I would think that would be part of the scope  
22 as well.

1 Oh, go ahead, Gordon.

2 MEMBER VAN WELIE: I was just  
3 going to point out the linkage between this  
4 and some of the recommendations embedded  
5 around modeling, and so forth. So, we already  
6 have on the table the need to improve the  
7 modeling. The modeling is a very intrinsic  
8 part of the next-generation of EMS. So, I  
9 just wanted to remind you of that linkage.

10 MEMBER ROBERTS: We had during  
11 the transmission planning discussions, when I  
12 asked the question about the storage, there  
13 are no models. And so, that is why they just  
14 happened by default, kind of wing it a little  
15 bit.

16 And so, I know some effort is  
17 going on in that arena. I know the Storage  
18 Subcommittee is going to entertain a paper and  
19 discussion in our next meeting on that  
20 subject. But I think that falls into that  
21 whole category.

22 CHAIR COWART: This is on

1 modeling?

2 MEMBER ROBERTS: Detailed models  
3 of storage and how you model it.

4 But then, also, Ralph and I just  
5 talked about I think we need to continue on  
6 the topic of microgrids. There is a lot  
7 there.

8 CHAIR COWART: Wanda?

9 MEMBER REDER: Yes, I think it is  
10 time to assess the benefits of the projects  
11 that went in through the stimulus effort and  
12 really showcase the successes. You know,  
13 there is definitely a wonder, and I think it  
14 will be an ideal opportunity in 2012 to really  
15 bring some visibility to the good work that  
16 has been done. And to the extent that there  
17 have been challenges or barriers, that might  
18 be suggestions of where we focus some policy  
19 discussion.

20 MR. D. MEYER: More specifically,  
21 going back to the microgrid discussion this  
22 morning, what in your view are the central

1 issues, questions, problems that cry out for  
2 attention? I don't know that, reviewing the  
3 benefits of the Recovery Act projects, some of  
4 those are related to microgrids; others are  
5 not. I mean, I don't know; were you talking  
6 about just the microgrid projects or the  
7 storage projects, or what?

8 MEMBER REDER: Actually, I was  
9 talking about all of them. There was some  
10 discussion in Bill's vision statement early on  
11 that said, you know, in 60 months those kinds  
12 of things will be highlighted. I think,  
13 actually, we have to highlight those in  
14 parallel with the projects actually going on.

15 Right now, the industry is craving  
16 understanding the benefits, understanding best  
17 practices, lessons learned. This goes across  
18 the projects. So, it is storage. It is the  
19 microgrids. And we have an opportunity, I  
20 think, as we find those successes, to bring  
21 visibility to them.

22 MS. WELSH: Just a point of

1 information, the ARRA projects are just now  
2 beginning to report benefits. October was the  
3 first reporting period. So, next year will be  
4 full of rich data, but we probably need about  
5 six months to give the projects time.

6 There is a very rigorous metrics  
7 and benefits analysis effort going on by Joe  
8 Paladino and his team, which is made up of  
9 several National Labs. So, we should look to  
10 ask for that information at our July meeting,  
11 so that they have the benefit of six to eight  
12 months' worth of metrics reported in and  
13 analyzed.

14 MEMBER ROBERTS: David, back to  
15 your point on microgrids, one of the areas I  
16 think has to be the economic impact on  
17 operating utilities.

18 MEMBER HEYECK: I am not sure if  
19 this is a topic. But given the fact that R&D  
20 dollars are scarce, we have a body of R&D  
21 dollars in EPRI. I think in T&D space they  
22 spend about \$90 million a year. And there is

1 a body in the Department. I am wondering if  
2 we are making the best use of those dollars  
3 where there is overlap, where collaboration  
4 can occur.

5 CHAIR COWART: It is an  
6 interesting question. And I wonder whether  
7 this Committee could opine usefully on it. It  
8 sort of sounds like the QTR kind of question.  
9 I wonder what the Department, you know, Mr.  
10 Koonin, thinks about that, yes, about whether  
11 the coordination between DOE and EPRI and the  
12 Labs' research agendas has been thought  
13 through. I assume it has as part of QTR.

14 MR. D. MEYER: On that, I like the  
15 approach that Mike has laid out before. That  
16 is, let's see where the gaps are, if there are  
17 gaps.

18 There is an Office of Science at  
19 DOE that does some very fundamental research.  
20 I mean, they took a very strong interest in  
21 storage -- this was a couple of years ago --  
22 because they saw that storage was potentially

1 just a breakthrough area. And they have a  
2 continuing interest in storage, I'm sure.

3 But there is also the ARPA-E  
4 office, which is separate from the Office of  
5 Science. And they have undertaken a bunch of  
6 high-risk, high-payoff R&D projects, only some  
7 of which pertain to the electricity sector,  
8 but quite a number of them pertain to the  
9 electricity sector.

10 And exactly how they have selected  
11 their projects, I don't have good information  
12 on the process they have gone through. But I  
13 think that the sort of gaps review that you  
14 have outlined fits very well.

15 And I have to caution that we --  
16 we and you -- are probably not going to be  
17 able to pursue all of these things. We are  
18 coming up with a pretty big menu here. But  
19 that is exactly what we ought to be doing, is  
20 coming up with a good menu and then saying,  
21 now, out of this range of possibilities, what  
22 do we really want to focus on?

1                   CHAIR COWART: Let me put two more  
2 on the table that came up in conversations  
3 with the Subcommittee Chairs yesterday.

4                   One I think Wanda may have put on  
5 the table. That is asking us to look  
6 generally at the question of aging  
7 infrastructure and wondering, what is the pace  
8 of reinvestment or replacement that is going  
9 to be needed, just to get an idea about that.  
10 And then, to draw attention to the policies  
11 that would be called on to make sure that  
12 replacement of that infrastructure isn't  
13 locking in the technology of the past rather  
14 than the technology we will need in the  
15 future.

16                   And if I have stated your  
17 suggestion accurately, that is a high-level  
18 policy issue that might be appropriate for  
19 this Committee to take a look at.

20                   MEMBER REDER: Yes, you have it,  
21 right, in that, overall, the assets are aging,  
22 and Mike had some statistics earlier. I think

1 from an infrastructure perspective, we need to  
2 take a look at that. And then, rather than  
3 get into a rut of replacing like for like,  
4 look at where Smart Grid infrastructure can be  
5 used appropriately, weaving in benefits and  
6 understanding the different scenarios.

7 CHAIR COWART: Now, David, you may  
8 articulate this somewhat differently. But  
9 whenever I talk to David about transmission  
10 planning, he expresses a strong interest in  
11 having the policymakers focus on ways to  
12 improve participation in or the process of  
13 transmission planning, not the technical  
14 modeling, not the technical side of it, but  
15 the process of transmission planning in such  
16 a way that there will be greater public  
17 acceptance of the need for new assets, when  
18 that need determination has been made via a  
19 process that has a lot of public input and  
20 support.

21 And there may be policy  
22 recommendations to the Department or that the

1 Department could make to sister agencies that  
2 would assist in the location, in the siting of  
3 transmission, once a need determination has  
4 been made, something like that.

5 Now you can improve my statement

6 MR. D. MEYER: Right. Okay.

7 Think of it this way: that is, how would  
8 things be different if there were an Executive  
9 Order from the President telling federal  
10 agencies that they will adopt a rebuttable  
11 presumption that, if a transmission expansion  
12 plan has bubbled out of a particular  
13 subregional or regional area under Order 1000,  
14 and that plan has gone through whatever  
15 reviews are appropriate, that, at any rate,  
16 the federal agencies will adopt a rebuttable  
17 presumption that the need determination has  
18 been affirmatively met on the basis of that  
19 Order 1000 process.

20 So, what that means is, if you are  
21 a regional forester out somewhere in the West,  
22 and a company comes to you with an application

1 to run a transmission line across a part of a  
2 national forest that you are responsible for,  
3 this regional forester, before he or she can  
4 make a decision about granting that permit,  
5 they have to do an Environmental Impact  
6 Statement under NEPA. But the scope of that  
7 Environmental Impact Statement is always  
8 something to be determined through scoping  
9 meetings, they are called.

10 And today it frequently happens  
11 that the regional forester gets drawn into the  
12 question of need. Is this facility needed?  
13 And you have to satisfy that need question  
14 before you can go on to the siting question.  
15 That is, the one question is, is it in the  
16 public interest to develop this facility? The  
17 second question is, assuming you have an  
18 affirmative answer on the question, where do  
19 you put it?

20 And so, the assumption here is  
21 that the existing process for determining need  
22 needs to be made more rigorous, needs to be

1 tightened up, made more rigorous, and more  
2 dispositive of the need question. You are  
3 still always going to have a need for a  
4 handoff kind of from the technical analysts  
5 who do the planning, and so on, to a  
6 government official, whether it is a state  
7 official or a federal official. And so,  
8 public officials are always going to determine  
9 need, but it is on the question of what.

10 And so, we are saying, if you had  
11 an arrangement where the federal official  
12 would give the rebuttable presumption to this  
13 technical analysis -- now that doesn't mean  
14 that the federal official is locked into  
15 accepting that at face value. But if they are  
16 going to not accept it, the burden of proof is  
17 on them to show why should this analysis not  
18 be deemed sufficient.

19 But to ask the benefit of this is  
20 that right now we are seeing that all-too-  
21 frequently you get litigation and relitigation  
22 and relitigation of the need issue, and in

1 this loop that you can't seem to get out of.  
2 And so, we are trying to find a way to take  
3 care of that.

4 But, once you get the need  
5 question nailed, then, hey, it is in the  
6 public interest to find a place to put this  
7 thing. If you can enable state officials or  
8 federal officials to say to themselves the  
9 need question has been settled, it is my job  
10 to find a place to put this thing, to me,  
11 there is a lot of benefit from that.

12 But this is an idea that is sort  
13 of percolating around with us, and we are just  
14 sort of throwing it out there to see whether  
15 it resonates.

16 Now let me add that what this does  
17 is to put a huge amount of weight on the Order  
18 1000 planning process. And it may add  
19 requirements to that process that go beyond  
20 the existing wording of Order 1000; I don't  
21 know.

22 But it certainly means that, if we

1 were to go to the Forest Service now and just  
2 sort of ask them, "What do you think about  
3 this rebuttable presumption idea? How does  
4 that sound to you?", I could imagine them  
5 saying, "Well, not a bad idea, but we have to  
6 be sure that Order 1000 is going to deliver,  
7 that it is going to take into account that the  
8 plan is operating under Order 1000, or going  
9 to take into account our concerns. If we can  
10 be assured that our stuff is going to be  
11 factored in, we will be happy to take its  
12 results."

13 But it isn't just the federal  
14 agencies that would feel that way. I can see  
15 a lot of other constituencies saying, "Man, if  
16 Order 1000 is going to have this kind of  
17 clout, I have to take it more seriously; I  
18 have to make sure that various things are  
19 factored in."

20 But, to me, what's not to like  
21 about that? You know, I mean, if we are going  
22 to have Order 1000, let's make it work.

1                   So, sorry.

2                   Rich?

3                   MEMBER R. MEYER: We really  
4 support the need for transmission to be built.  
5 We supported Order 890. We like the fact that  
6 Order 1000 builds on 890. Anything that moves  
7 this process, the transmission siting along,  
8 we like. And I like the idea of that kind of  
9 presumption because it helps things move  
10 along.

11                   NRECA, along with a number of  
12 other folks, were parties to the 4th Circuit  
13 litigation that FERC lost. We were there  
14 supporting the government. We were also -- I  
15 don't remember if we were interveners or  
16 amicus in the 9th Circuit decision.

17                   And we fully appreciate the  
18 negative momentum that occurs when such losses  
19 are suffered. Within that context, I simply  
20 raise the issue of this: the question of need  
21 is answered by looking at the facts, the  
22 evidence rather, under whatever the applicable

1 statute is. And therefore, material research  
2 is needed to determine whether the Secretary  
3 of Energy or any single official can deem a  
4 particular presumption to be made, such that  
5 the burden of proof is then on someone else,  
6 whether that kind of Executive Order or  
7 otherwise is sufficient to affect how the law  
8 and evidence fit together.

9 Please do not take my caution as a  
10 suggestion that you can't do it. I offer the  
11 suggestion because I fully appreciate, as you  
12 do, how important it is to get this moving  
13 forward and not suffer an additional loss in  
14 the courts.

15 CHAIR COWART: David?

16 MEMBER NEVIUS: I also agree,  
17 David, with what you said about -- and what  
18 Rich said, too, about -- getting the need  
19 identified. I am reminded, however, of a  
20 similar process that was followed in Alberta,  
21 and they went through the whole need  
22 determination first.

1                   It was a two-step process. First,  
2 they did the need. Then they established  
3 that. Then they went and did the siting.

4                   Not everybody showed up to comment  
5 during the determination of need, but they all  
6 showed up when it got to be the siting or the  
7 routing hearing. And they had to go back  
8 around again.

9                   So, it is important to get people  
10 involved upfront in that need determination  
11 process and make sure that they are all heard  
12 there. And then, the only thing that remains,  
13 then, is to decide on the route, and that is  
14 all that is left.

15                   They thought they had a perfect  
16 process, and it failed because they didn't  
17 encourage or cause everybody to get involved  
18 during the need determination step.

19                   CHAIR COWART: Mike?

20                   MEMBER HEYECK: Let me describe  
21 the PATH project. The PATH project had to go  
22 through West Virginia, Virginia, and Maryland.

1 It was in the NEPA process, headed by the  
2 National Park Service.

3 It was first designated to be  
4 needed by 2012. Then it was 2013. Then it  
5 was 2014. Then it was indeterminate. Then it  
6 was 2014 again. Then it was indeterminate.

7 The problem is the cycle time of  
8 any review process, regulatory or otherwise,  
9 encompasses about two or three planning  
10 cycles, to the point where you are always  
11 adjudicating the need.

12 And frankly, being a planner from  
13 the old days, that line is a no-brainer. Yet,  
14 it sits there with a \$125 million worth of  
15 investment without anything in the ground.

16 I bring this example up because I  
17 made the comment about solving world hunger.  
18 And I am absolutely with you, David, on this,  
19 but how do we get to a point where we actually  
20 have a measurable impact on this process of  
21 siting?

22 If the NEPA process could look

1 back to what comes out of the planning  
2 authority, then what I would say is make sure  
3 the planning authority doesn't have a cycle  
4 time that is shorter than the process for  
5 NEPA. And that would be very helpful.

6 We have got to get a point where  
7 we recognize that the planning processes are  
8 deterministic. They are predicting a future.  
9 You can't get a micrometer out there to try to  
10 figure out the exact date of need.

11 But I like your thought. I just  
12 want to be careful that we don't get to a  
13 point of wasting a lot of energy producing a  
14 recommendation that yields very little impact.  
15 And I am saying that from, when I was here in  
16 2008 trying to move toward taking NIETC beyond  
17 its current scope, and then NIETC went the  
18 other direction. So, siting is hard.

19 MR. D. MEYER: Well, there are  
20 other ways maybe to frame this concept or this  
21 idea. But, to me, doing a better job on the  
22 needs side is pretty darn important.

1                   And so, we hit on this one way  
2                   that it might be improved. There are probably  
3                   others. But I am looking for ways in which we  
4                   can tighten up this process, make it more  
5                   rigorous, make it more dispositive of the  
6                   questions, the need question.

7                   CHAIR COWART: Mike?

8                   MEMBER WEEDALL: So, two thoughts.  
9                   One is just to follow on this line of  
10                  conversation. I would just offer that one of  
11                  the ways that we have had some great success  
12                  in the Northwest is, again, along the non-  
13                  wires. We put together a roundtable of  
14                  regional leaders and some folks from outside  
15                  the region.

16                  And particularly if you have got a  
17                  line that is a lightning rod for the public,  
18                  we found that this is just a great way to get  
19                  the public involved with those experts and to  
20                  diffuse some of the criticism, for them to  
21                  really see what the options are.

22                  So, I just throw that out as far

1 as one tool that we put together a few years  
2 ago. Again, it has been a big hit for us.

3 The other thing is just to go back  
4 to the brainstorming part of this exercise and  
5 just to join the chorus and to say, you know,  
6 looking at the issues around integration with  
7 the grid, with all of the technologies that  
8 are coming, renewables, et cetera, obviously,  
9 people know what a nightmare we had in the  
10 Northwest this past spring with the wind and  
11 too much water and the fish, and balancing all  
12 of that.

13 We knew this was coming. We just  
14 didn't expect all the circumstances to hit at  
15 once. So, we thought it was going to come  
16 somewhere down the road.

17 But I think the experience there  
18 cries for -- you know, it could happen to us  
19 again this year. It certainly is going to be  
20 becoming more of a problem for other entities,  
21 too.

22 MR. WHITELEY: Order 1000, as I

1 understand it from FERC, does require people  
2 as they develop long-term transmission plans,  
3 to consider non-wires alternatives. I mean,  
4 that is built in. I am not saying there isn't  
5 a fair amount of homework to do to make that  
6 real, to make that consideration of  
7 alternatives real and thorough and solid, yes.  
8 But it is in there.

9 CHAIR COWART: Wanda.

10 MEMBER REDER: I am going to  
11 change the topic a little bit. When Bill  
12 presented the vision, when we first kicked  
13 off, there was a fair amount of discussion on  
14 socializing the idea from a region perspective  
15 and maybe getting some alignment with EPRI and  
16 CIGRE and EEI, NRECA, and others, to kind of  
17 get some consensus, if you will, from a vision  
18 perspective and then go out and have good  
19 dialog and interaction.

20 I wonder if we should add that to  
21 our list for 2012.

22 CHAIR COWART: That seemed to be

1 the discussion at the moment when Bill was  
2 here, that we did want to follow up on that  
3 and have some feedback from the Department to  
4 the Committee, and make it more of a dialog.  
5 So, yes, that should be on the list.

6 MEMBER REDER: Yes, I just want to  
7 make sure it is on the list.

8 CHAIR COWART: Yes, that's right.  
9 Gordon?

10 MEMBER VAN WELIE: So, I was just  
11 hoping you could expand on the process whereby  
12 the Committee will decide on what it is going  
13 to work on in 2012. A little while ago, we  
14 were having this discussion about we would  
15 like to work on the things that the DOE wants  
16 us to work on.

17 So, we could sort of generate a  
18 long list of ideas forever here. And I just  
19 wondered when in the process we get to hear  
20 what is on the DOE's mind, so that we could  
21 look at the relative importance of these  
22 things.

1                   MR. D. MEYER: Yes. We will.  
2                   Peggy has been taking a lot of notes here. We  
3                   will have a good menu of possibilities, and  
4                   Pat has some ideas of her own. Bill Parks has  
5                   some ideas, I expect, Hank Kenchington, and  
6                   maybe some others. So, we will have some  
7                   things to add to the list that is going to be  
8                   collected here.

9                   Then, this remains to be vetted  
10                  with Pat and others. But my sense is it would  
11                  be nice to have some kind of discussion to  
12                  enable you folks to have a discussion with  
13                  appropriate people around the Department. I  
14                  mean, if it is an R&D strategy question, then  
15                  we should get somebody from ARPA-E and the  
16                  Office of Science in, and so on.

17                  I am trying to find an efficient  
18                  way to handle this other than just having you  
19                  march through topic-by-topic talking with  
20                  subsets of Department officials, trying to  
21                  consolidate these things.

22                  Maybe a better way would be to

1 bundle these topics in some way and do three  
2 or four with one subgroup of Department  
3 officials and three or four with another, or  
4 something like that. But I think that kind of  
5 exchange ought to happen, so that, in the end,  
6 we have a list that we can come back to you  
7 and say, "Please address these topics."

8 But that would also give us the  
9 sense that you feel that, yes, these are  
10 important topics; yes, these are things that  
11 you want to put time on; yes, these are things  
12 where you feel you have got expertise to  
13 offer, and just a good fit.

14 SECRETARY HOFFMAN: Gordon, one of  
15 the things that the leadership talked about  
16 yesterday was getting the senior DOE staff  
17 together with the leadership, which includes  
18 the Chair and all the Subcommittee Chairs, and  
19 having a couple of hour-long discussions. I  
20 think what these guys are wanting to do is get  
21 your input and then have that discussion, and  
22 then bring it back to the Committee.

1                   CHAIR COWART: It is, obviously, a  
2 little bit of a Venn diagram here among three  
3 different things. What do we think are the  
4 most important things for the public good?  
5 What do we think this Committee is best suited  
6 to work on? And what are the topics where the  
7 Department has a present need and where our  
8 input would actually be relevant to a decision  
9 or a process that is underway.

10                   And so, I think it is a little bit  
11 of a circular process at this point, until we  
12 sit down with the Department. But it is a  
13 very good question.

14                   Mike?

15                   MEMBER HEYECK: On the on subject,  
16 I don't want to be too negative on the siting.  
17 We just need to discuss what part of that  
18 crumb that we could actually take forward with  
19 some success. So, don't take my lashes from  
20 the PATH exercise as too negative on that.

21                   Another topic, actually, I like  
22 the process that Peggy and Rich talked about,

1 that the Subcommittee Chairs meet with staff.  
2 There is a back-and-forth process, and then  
3 there is something that goes to the full  
4 Committee, I would say prior to the full  
5 Committee's meeting, and then decide on what  
6 we are going to do.

7 The item I would like to just add  
8 to the table is the environmental rules that  
9 are coming down the pike certainly will cause,  
10 advance some retirements of some plants in the  
11 middle of this decade.

12 But, starting January 1st, 2012,  
13 there is going to be an impact that warrants  
14 monitoring. And that is, when does the  
15 industry run out of credits? On July the 18th  
16 next year, do we have to shut the plant down  
17 because we are done with credits in the area?

18 I think it is hard to plan for  
19 that. Certainly, the RTOs are looking at  
20 that, as well as NERC. But it might not be  
21 bad to take a look at the experience,  
22 particularly next summer, and how that

1 projects to the point.

2 Because I think we are focused on  
3 the retirements, but in between there's going  
4 to be dispatch issues because of emission  
5 limits. And we are just going to have to  
6 watch that.

7 CHAIR COWART: Wanda?

8 MEMBER REDER: Yes, I have been  
9 thinking, and I don't know if this would be an  
10 appropriate topic or not, but I will put it on  
11 the table. I wonder if it would be  
12 appropriate for us to look at kind of the  
13 reliability risk factors.

14 So, you know, if you look at the  
15 mix of generation, there is a lot of  
16 uncertainty. What happens if there is a  
17 problem with fracking and, you know, there is  
18 a massive switch from nuclear, gas, and we  
19 certainly have the environmental impacts and  
20 the switch from coal. So, that is going on.  
21 Transmission siting is going on. Aging assets  
22 are going on and distribution.

1                   I wonder if it is the role of this  
2                   Committee to kind of step back and look at it  
3                   from a very holistically perspective and say,  
4                   what are the reliability risks and the various  
5                   scenarios?

6                   It's an idea and it might be too  
7                   macro in order to get our hands around. But  
8                   I also ask the question, if we don't do it,  
9                   who will?

10                   MEMBER VAN WELIE: I think the  
11                   planning authorities have to it. I mean, if  
12                   you think about the EIPC discussion, that is  
13                   part of what you put into the scenario  
14                   analysis. So, I am not sure this is the right  
15                   group to do something like that.

16                   MR. D. MEYER: There are two parts  
17                   to that. One is just the information itself  
18                   in order to be able to appropriately  
19                   appreciate risks. Then, there is the  
20                   consideration of that information by the  
21                   appropriate bodies.

22                   So, there might be some things the

1 Committee could do on the front end, leave the  
2 actual formal consideration of those things to  
3 other people.

4 MEMBER VAN WELIE: I guess I have  
5 struggled to see what the Committee could do.  
6 I could see the DOE having a role in this.  
7 So, if what you are thinking of here is a risk  
8 assessment which says, "We're the DOE. We've  
9 got to worry about the integrity of the  
10 electricity system for the nation," and you  
11 want to make sure that there is an adequate  
12 risk assessment being done by the people who  
13 are planning, you are going to get that  
14 information in some ways through these various  
15 plans, the interconnection-wide plans.

16 So, what would you want the  
17 Committee to do, is the question, that is not  
18 duplicative of something that is already  
19 happening, would be my question.

20 CHAIR COWART: I think that we can  
21 leave your question as maybe the last point on  
22 this point.

1 MS. WELSH: I wanted to just ask  
2 one thing. I did talk to Bill after the  
3 presentation and said that we got some initial  
4 feedback on the vision, but he didn't lead  
5 with an ask of this Committee.

6 And so much of what DOE is going  
7 to be doing that has an interest for this  
8 Committee is going to be based on that new  
9 framework and that new vision, I said, "When  
10 can you come back?" And he said he needs six  
11 months to go out and vet this.

12 But I would suggest that this  
13 Committee, since we are the first people to  
14 see it and hear it and have an opportunity to  
15 comment on it, that maybe one of the first  
16 things we do is provide some written comments  
17 on that initial vision, even though he wants  
18 it to evolve and he wants to come back, having  
19 had six months' worth of input. He heard you  
20 all yesterday, but it is an opportunity for  
21 dialog with him; you know, maybe get a meeting  
22 with Lauren Azar and him and help with that

1 evolution of that vision. Just a suggestion.

2 MR. D. MEYER: On that point, yes,  
3 and the mention of Lauren Azar, Lauren has a  
4 lot on her plate right now. She has been  
5 perceived, rightly, as a very capable person  
6 who can troubleshoot things. And so, a lot of  
7 people who have troubles of one kind or  
8 another come knocking on her door.

9 But one possible thing for her to  
10 pay attention to is a lot of Bill's  
11 presentation yesterday was sort of divided  
12 into, well, he divided it into three  
13 components. That is, technology, R&D  
14 technology change, market design, and policy.

15 Then, some of the remaining stuff  
16 kind of tended to clump the market design and  
17 policy stuff into something called  
18 institutional problems. We have got  
19 technology/R&D kinds of activities. We have  
20 got another subset that is focused on  
21 institutions.

22 So, Lauren is kind of the chief

1 institutional wizard for us, and she is  
2 clearly the one to talk to on those kinds of  
3 questions.

4 MEMBER VAN WELIE: Peggy, just on  
5 this last point, the thing that sort of really  
6 worries me a little bit is I sense the DOE  
7 sort of struggling with, on the one hand, it  
8 feels a responsibility to ensure good  
9 outcomes, whatever that is. And on the other  
10 hand, it seems to me they have very little  
11 control over those outcomes because there are  
12 so many other players out there in the  
13 industry, you know, regulators at the state  
14 and the federal level, and policymakers that  
15 actually do have their hands directly on those  
16 outcomes.

17 And so, I come back to what I said  
18 yesterday. I wonder if the DOE is even better  
19 served sort of abandoning the notion that the  
20 DOE can affect these outcomes directly and  
21 saying there are certain things we want to see  
22 happen, though. Whatever the outcome is,

1       whatever the evolutionary process brings us,  
2       to Mike Heyeck's point that we have adequate  
3       spares of critical infrastructure in place,  
4       that we solve the gas/electric  
5       interdependency, that the cybersecurity issues  
6       are dealt with, and use the DOE's weight to  
7       ensure that those elements are taking care of  
8       irrespective of what the resource mix ends up  
9       being or what technology is used in order to  
10      achieve reliability in the long run.

11                 So, while I hear your question, I  
12      wonder how open the DOE is to even going down  
13      that path.

14                 MR. D. MEYER: Let me put out a  
15      theme that I have heard several times from the  
16      Secretary. He is very mindful of a peculiar  
17      federal role that he sees, and it is to keep  
18      the big picture in mind, keep reminding others  
19      of the need to keep that big-picture  
20      perspective.

21                 We recognize there are plenty of  
22      other actors out there who have their own

1 responsibilities, and we are not trying to  
2 interfere with their exercise of those  
3 responsibilities.

4 But, nonetheless, our job is to  
5 focus on the big picture and from time to time  
6 speak up about if we think the big picture or  
7 aspects thereof are not being given adequate  
8 consideration or attention. And so, I think  
9 that is a good part of what we are trying to  
10 do here.

11 I mean, you heard Bill say some  
12 folks have -- we are up against this situation  
13 where the old paradigm for the grid looks like  
14 it is not so helpful anymore because we are  
15 adding all of these new variables, new  
16 requirements, new design requirements. So,  
17 what is the new grid paradigm going to look  
18 like? What is the new industry paradigm going  
19 to look like? What new business models need  
20 to be embedded, and so on?

21 It is very hard to see through a  
22 lot of those problems. But I think it is

1 important to continue to think in that mode,  
2 to try to come to grips with these things, to  
3 get a sense of what do we know, what don't we  
4 know; what things are we never -- I mean,  
5 obviously, the uncertainties are so great here  
6 that we have learned there is no way we can  
7 accurately forecast, say, 20 years out.

8 Right now, one way that I think  
9 about that seems to me like it is useful, we  
10 have got the industry saying, well, we think  
11 we can plan out 10 years, yes, sort of, if we  
12 keep looking at it on an iterative basis.

13 But it is also useful to be  
14 looking out 20 years. Some of these 20-year  
15 looks could inform the planning done under  
16 Order 1000. Say, you know, when you are  
17 making those 10-year plans, give some thought  
18 to the fact that you are going to have to be  
19 prepared at the end of that 10 years to face  
20 some other problems that you might not -- I am  
21 saying that, if you are only looking in short  
22 time blocks, you can get to a situation where,

1 all of a sudden, you are not well-prepared for  
2 the next decade. You know, you might have  
3 done a great job for this decade, but then you  
4 are just not ready.

5 So, you need to be thinking about  
6 in these multiple timeframes and recognizing  
7 the need to always update your thinking  
8 periodically.

9 And so, I think there is a role  
10 here for the Department, and I think that we  
11 do have some R&D money to spend, and there  
12 ain't nobody else who is going to be able to  
13 do that. So, it is very important that we get  
14 that part of it right. But we need to be  
15 thinking about the institutional things as  
16 well.

17 MS. WELSH: And to piggyback onto  
18 that, I get phone calls weekly on what this  
19 Committee is doing by people outside this  
20 Committee. I got a call two weeks ago from a  
21 lawyer who was in litigation and wanted a copy  
22 of one of our transcripts.

1                   So, having this Committee opine on  
2 things, by the weight that this Committee  
3 carries in and of itself is helpful. Whether  
4 it is specific or on broader national policy,  
5 people are watching you and assuming that you  
6 have the ear of the Department, and that what  
7 you opine on is listened to. So, the activity  
8 to just undertake an exercise to have this  
9 Committee make a statement on something has  
10 value and weight.

11                   MEMBER VAN WELIE: But perhaps I  
12 can state my concern another way, which is it  
13 strikes me that one's view -- you know,  
14 capturing a vision is very much a function of  
15 the political process. And I am looking for  
16 a way to have the DOE create some stability  
17 for the industry from a policy point of view.  
18 And if the vision is sort of tied into sort of  
19 one current Administration's view on things,  
20 my fear is that, should that change, all of  
21 that gets dumped and two years later we might  
22 be talking about another set of agendas.

1                   And so, how do we sort of pick  
2 themes that could persist from Administration  
3 to Administration and have those carry forward  
4 and have it be a stable policy signal to the  
5 industry? That is in some ways what I am  
6 searching for.

7                   And I guess what was worrying me a  
8 little bit about the vision that I saw  
9 yesterday is you are going to have sort of  
10 half the country agree with the Chair, and you  
11 are going to have the other half of the  
12 country saying, "No way." And that strikes me  
13 as being an unstable signal for the industry.  
14 That is my concern.

15                   CHAIR COWART: David, I think you  
16 are going to have the last word because we  
17 need to --

18                   MEMBER NEVIUS: Oh, no pressure.  
19 No pressure.

20                   (Laughter.)

21                   I have been thinking about how to  
22 say this. And Gordon gave me a little bit of

1 a clue, I think. Rather than DOE saying,  
2 "Well, here's the vision: gas prices are  
3 going to do this or the share of gas for  
4 electric generation is going to be this, and  
5 coal is that," and so on, and then talk about  
6 R&D needs, and so on, because we don't know  
7 what it is going to be. We just don't know.

8 Now let me go back to a  
9 presentation I heard many, many years ago by  
10 Vikram Budhraj, when he was a System Planning  
11 Manager at Southern Cal Edison. What they did  
12 is they came up with a plan, and then they  
13 tested that plan against certain futures to  
14 see how robust it was to be able to respond  
15 and adapt to all these different futures that  
16 no one could predict.

17 And I wonder if there is something  
18 along those lines that would be a better way  
19 to approach this. So, rather than DOE saying,  
20 "Well, here's the vision," there is no "the  
21 vision". There's a lot of visions, and we  
22 don't know what it is going to turn out to be.

1 But maybe there is a way to use that approach.

2 MR. D. MEYER: Well, I think Bill  
3 got that message loud and clear yesterday,  
4 that putting those numbers up, especially at  
5 the front end of the presentation, is a red  
6 herring. It just throws people off on the  
7 wrong track, that we need to emphasize the  
8 uncertainty of a lot of these things much  
9 more, yes, yes.

10 CHAIR COWART: That is a very  
11 appropriate final statement for this meeting.  
12 Thank you very much for all the ideas and the  
13 conversation.

14 I suspect we are just going to  
15 have to digest it and, as David suggested, the  
16 Subcommittee Chairs are going to be needing to  
17 meet with folks in the Department to come up  
18 with a candidate list of suggested topics,  
19 which we will then share with the full  
20 Committee. I think that is how we are going  
21 to have to proceed.

22 Any final comments from you all,

1 other than my saying thank you very much to  
2 the stalwart members of the Committee still  
3 with us?

4 MEMBER REDER: We will, obviously,  
5 be circulating this EV for a final vote after  
6 comments are incorporated.

7 CHAIR COWART: That is correct.  
8 The EV paper will be circulated.

9 And we are adjourned.

10 Thank you very much.

11 (Whereupon, at 4:01 p.m., the  
12 foregoing matter was concluded.)

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| <b>A</b>                  |                             |                           |                           |                            |
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C E R T I F I C A T E

This is to certify that the foregoing transcript

In the matter of: Electricity Advisory Committee

Before: US DOE

Date: 10-20-11

Place: Washington, DC

was duly recorded and accurately transcribed under my direction; further, that said transcript is a true and accurate record of the proceedings.

*Neal R Gross*  
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Court Reporter

**NEAL R. GROSS**

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